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=> FILE WPIX
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=> D QUE L26
L7          1252 SEA FILE=HCAPLUS ABB=ON  (LIQUID? OR GAS OR GASES OR GASEOUS
                 OR FEED?) AND CARBON(2W)ELECTRODES
L15            7 SEA FILE=WPIX ABB=ON  MAGNECUL?
L16         4453 SEA FILE=WPIX ABB=ON  (LIQUID? OR GAS OR GASES OR GASEOUS OR
                 FEED?)(S)ELECT?(2A)ARC?
L17         1511 SEA FILE=WPIX ABB=ON  CARBON(2A)ELECTRODES
L18           46 SEA FILE=WPIX ABB=ON  L16 AND L17
L19           86 SEA FILE=WPIX ABB=ON  L7 AND ARC?
L20            2 SEA FILE=WPIX ABB=ON  (L19 OR L18) AND (IR OR UV OR INFRARED
                 OR INFRA(W)RED OR ULTRA(W)VIOLET OR ULTRAVIOLET OR VIBRATION?)
L21            0 SEA FILE=WPIX ABB=ON  (L19 OR L18) AND SPECTR?
L23           14 SEA FILE=WPIX ABB=ON  (L19 OR L18) AND B01J019?/IC
L24           22 SEA FILE=WPIX ABB=ON  L15 OR L20 OR L21 OR L23
L25            9 SEA FILE=WPIX ABB=ON  (US2001-826183/PRN OR US1998-106170/PRN
                 OR US1998-133348/PRN OR US1999-372278/PRN OR US1994-254377/PRN
                 OR US1997-785797/PRN OR US2000-586926/PRN OR US2001-896422/PRN
                 OR US2001038087/PN OR US2002-277841/PRN OR US2002-65111/PRN OR
                 US2004149591/PN OR WO2003002250/PN OR EP1387876/PN OR US1998-13
                 2369/PRN OR US1998-15895/PRN OR US1998-221803/PRN OR US2000-635
                 448/PRN OR US2004074781/PN OR US6113748/PN OR US6299656/PN OR
                 US6540966/PN OR US6689259/PN OR WO2002-US10904/PRN OR WO2002081
                 601/PN)
L26           16 SEA FILE=WPIX ABB=ON  L24 NOT L25
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KATHLEEN FULLER EIC 1700 REMSEN 4B28 571/272-2505

=> D L26 FULL 1-16

L26 ANSWER 1 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2004-728448 [71] WPIX
DNN N2004-576952 DNC C2004-255942
TI Continuous production of, e.g. carbon-based nanotubes, by guiding carrier plasma gas, vaporized carbon precursor and catalyzer through nozzle into quenching zone, and controlling gas temperature in the quenching zone.
DC A97 E36 Q68 U11 U12
IN CHARLIER, J; FABRY, F; FLAMANT, G; GONZALES, J; GRIVEI, E; GRUENBERGER, T M; OKUNO, H; PROBST, N
PA (ARME) ARMINES ASSOC RECH DEV METHODES; (TIMC-N) TIMCAL SA
CYC 108
PI WO 2004083119 A1 20040930 (200471)* EN 39 C01B031-02
RW: AT BE BG BW CH CY CZ DE DK EA EE ES FI FR GB GH GM GR HU IE IT KE LS LU MC MW MZ NL OA PL PT RO SD SE SI SK SL SZ TR TZ UG ZM ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BW BY BZ CA CH CN CO CR CU CZ DK DM DZ EC EE EG ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NA NI NO NZ OM PG PH PL PT RO RU SC SD SE SG SK SL SY TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW
DE 10312494 A1 20041007 (200471) B82B003-00
ADT WO 2004083119 A1 WO 2004-EP3000 20040322; DE 10312494 A1 DE 2003-10312494 20030320
PRAI DE 2003-10312494 20030320
IC ICM B82B003-00; C01B031-02
ICS **B01J019-08**
AB WO2004083119 A UPAB: 20041104
NOVELTY - Carbon-based nanotubes, nanofibers and nanostructures are produced by introducing a carbon precursor and/or catalyzers and/or carrier plasma gas, vaporizing the carbon precursor; guiding the carrier plasma gas, the vaporized carbon precursor and the catalyzer through a nozzle into a quenching zone; and controlling gas temperature in the quenching zone.

DETAILED DESCRIPTION - Continuous production of carbon-based nanotubes, nanofibers and nanostructures involves generating plasma with electrical energy; introducing a carbon precursor and/or catalyzers and/or carrier plasma gas in a reaction zone of an airtight high temperature resistant vessel optionally having a thermal insulation lining; vaporizing the carbon precursor in the reaction zone at a very high temperature, preferably at least 4000 deg. C; guiding the carrier plasma gas, the vaporized carbon precursor and the catalyzer through a nozzle whose diameter is narrowing in the direction of the plasma gas flow; guiding the carrier plasma gas, the vaporized carbon precursor and the catalyzer into a quenching zone for nucleation, growing and quenching operating with flow conditions generated by aerodynamic and electromagnetic forces so that no recirculation of feedstocks or products from the quenching zone into the reaction zone occurs; controlling the gas temperature in the quenching zone between 4000 deg. C in the upper part of this zone and 50 deg. C in the lower part of this zone and controlling the quenching velocity at 103-106 K/s; quenching and extracting carbon-based nanotubes, nanofibers and other nanostructures from the quenching zone; and separating carbon-based nanotubes, nanofibers and nanostructures from other reaction products.

INDEPENDENT CLAIMS are also included for:

(a) a reactor to carry out the process comprising a head section having 2-3 **electrodes** (3) and **carbon** precursor supply

and/or a catalyst supply and/or a **gas** supply for creating an **electric arc** between the **electrodes** when electric power is supplied, and creating an arc zone, into which the **gas** from the **gas** supply can be fed to generate a plasma **gas** and for heating the carbon precursor at a vaporization temperature higher than 4000 deg. C; injector(s) (5) for carbon precursor and/or catalyst injection into the reaction zone; a reaction zone; quenching zone (6); and nozzle shaped choke;

(b) carbon nanostructures having the structure of a linear-chain of connected, identical sections of beads, such as spheres or bulb-like units or trumpet shaped units, preferably having a diameter of the spheres of the spherical section of the bulb-like units or respectively the large diameter of the trumpet shaped section of 100-200 nm, more preferably having all spheres or bulb-units exhibiting nearly the same diameter, and in particular comprising periodic graphitic nanofibers; and

(c) a composite of carbon nanostructures comprising carbon nanostructures and a polymer matrix.

USE - For producing carbon-based nanotubes, nanofibers, nanostructures, carbon black, fullerenes, single wall nanotubes, multi-wall nanotubes, carbon fibers, or carbon nanostructures, and catalyst (claimed).

ADVANTAGE - The method avoids the defect, provides nanotubes having different shape, e.g. bamboo-shaped structures that provides an easier way to store hydrogen between the graphitic cones and field emission properties that are known to depend on the topology at the nanotube tip apex, and more specifically to the conical angle.

DESCRIPTION OF DRAWING(S) - The figure shows a schematic view of facility or an apparatus for carrying out the process.

Electrode 3
Injector 5
Quenching zone 6
Heat exchanger 7
Separation system 8
Airtight valve 9
Dwg.1/9

TECH WO 2004083119 A1UPTX: 20041104

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Condition: The generation of plasma involves directing plasma **gas** through an **electric arc**, preferably a compound **arc**, created by **electrodes**. The plasma is generated using electrodes consisting of graphite. The arc is created by connecting an alternating current power source to electrodes, preferably one where the current frequency lies at 50 Hz to 10 kHz. The absolute pressure in the reactor is 0.1-30 bar. The nozzle used consists of graphite at its inner surface. It is formed as a continuous or stepped cone and has a downstream end that abruptly expands from the nozzle throat. The **gas** temperature in the reaction zone is higher than 4000 degrees C. The **gas** temperature in the quenching zone is controlled at 4000 degrees C in the upper part of this zone and 50 degrees C in the lower part of this cone. The carrier plasma **gas** flow rate is adjusted, depending on the nature of the carrier plasma **gas** and the electrical power, preferably at 0.001-0.3 Nm3/hour per kW of electric power used in the plasma arc. The quenching **gas** flow rate is adjusted, depending on the nature of the quenching **gas**, preferably 1-10000 Nm3/hour. A portion of the off-**gas** from the reaction is recycled as portion of the **gas** for generating the plasma, or as a portion of the **gas** for generating the quenching **gas**. A carbon precursor is injected through an injector, preferably through 2-5 injectors. A carbon precursor is injected into the reaction zone, with a

tangential, radial, and/or with an axial flow component into the reaction zone. The process is carried out in the total absence of oxygen or in the presence of a small quantity of oxygen, preferably at an atomic ratio oxygen/carbon of less than 1/1000. If the plasma **gas** is carbon monoxide, the process is carried out in the presence of oxygen with a maximum atomic ratio oxygen/carbon of less than 1001/1000 in the plasma **gas**.
Preferred Component: The carbon precursor is a solid carbon material, comprising carbon black, thermal black, graphite, coke, plasma carbon nanostructures, pyrolytic carbon, carbon aerogel, activated carbon, or other solid carbon material. A solid catalyst comprising nickel, cobalt, yttrium, lanthanum, gadolinium, boron, iron, or copper is introduced in the reaction zone. A **liquid** catalyst consisting nickel, cobalt, yttrium, lanthanum, gadolinium, boron, iron, or copper in a **liquid** suspension or as organometallic compound, is preferably added to the carbon precursor and/or to the carrier **gas**. A **gas** carrying a carbon precursor and/or carrying catalyst and/or to produce the plasma and/or to quench the products and/or to extract the products comprises hydrogen, nitrogen, argon, carbon monoxide, helium or other pure **gas** without carbon affinity and which is preferably oxygen free.
At least 5 preferably 20-50 beads are connected to one chain. The bead(s) is filled with catalyst, most preferably with nickel or nickel/cobalt. The bulb-like or bell-like are connected to each other using external graphitic cylindrical layers. The nanoconical structures (bamboo shaped structures) are stacked and have closed end conical tip apex and the other end being either open or filled with a metal nanoparticle.
Preferred Property: The external diameter of the nanotube is 100-120 nm and comprising discontinuous conical cavities. They are arranged in a random form having a scanning electron micrograph that resembles cooked spaghetti. They have both ends that are open, a layer having a diameter of 0.8-2 nm, and a length of the tubes is a few microns.

TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Component: The carbon precursor may includes acetylene black, methane, ethane, ethylene, acetylene, propane, propylene, heavy oil, waste oil, or pyrolysis fuel oil, preferably a liquid carbon material.
TECHNOLOGY FOCUS - MECHANICAL ENGINEERING - Preferred Component: The reactor has interior cylindrical shape, and high temperature exposed surfaces made of graphite containing high temperature resistant material. The reactor also includes a chamber with a height of 0.5-5 m and a diameter of 5-150 cm; temperature control mechanism for the quenching zone consisting of thermal insulating lining, fluid flow, preferably water flow, indirect heat exchanger (7), and flow and/or temperature controlled quench gas injection mechanism. The nozzle shaped choke is a tapering choke followed by an abruptly expanding section.

TECHNOLOGY FOCUS - POLYMERS - Preferred Component: The composite comprises polyethylene, polypropylene, polyamide, polycarbonate, polyphenylenesulfide, or polyester.

FS CPI EPI GMPI
FA AB; GI; DCN
MC CPI: A08-R03; E05-U02; E11-E; N01-D01; N02-A01; N02-B01; N02-C01; N02-D01; N03-A; N04-A; N05-C; N07-C
EPI: U11-C01J6; U12-B03F2; U12-E01B2

L26 ANSWER 2 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2004-627734 [61] WPIX
DNN N2004-496364 DNC C2004-225793
TI Manufacturing apparatus for manufacturing **carbon** nanotube

comprises **electrodes** having tips that are opposed to each other, power supply that applies voltage between two electrodes, and magnets that generates magnetic field.

DC E36 L03 U11 U12 V05

IN ANAZAWA, K; HIRAKATA, M; KISHI, K; SHIMIZU, M; WATANABE, H

PA (XERF) FUJI XEROX CO LTD

CYC 33

PI EP 1452486 A2 20040901 (200461)* EN 24 C01B031-02
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV MC MK NL PT RO SE SI SK TR
JP 2004256375 A 20040916 (200461) 23 C01B031-02
US 2004168906 A1 20040902 (200461) B01J019-08 <--

ADT EP 1452486 A2 EP 2003-21111 20030919; JP 2004256375 A JP 2003-51659 20030227; US 2004168906 A1 US 2003-656267 20030908

PRAI JP 2003-51659 20030227

IC ICM **B01J019-08**; C01B031-02
ICS H01J037-32; H05H001-50

AB EP 1452486 A UPAB: 20040923
NOVELTY - A manufacturing apparatus (13) comprises at least 2 electrodes (11, 12) having tips that are opposed to each other, power supply (18) that applies a voltage between the two electrodes to generate discharge plasma in a discharge area between the two electrodes, and magnets that generates magnetic field of multiple directions or magnetic field having component parallel with a flowing direction of discharge current.

DETAILED DESCRIPTION - Manufacturing apparatus comprises at least 2 electrodes having tips that are opposed to each other, power supply that applies a voltage between the two electrodes to generate discharge plasma in a discharge area between the two electrodes, and magnets that generates magnetic field of multiple directions or magnetic field having component parallel with a flowing direction of discharge current in discharge area of the discharge plasma. The thermal shield wall (30) made of a non-magnetic material is disposed between the magnets and generation area of the discharge plasma.

USE - For manufacturing a carbon nanotube (claimed) for field electron emitting source, diode or transistor.

ADVANTAGE - The invention is capable of manufacturing a relatively high purity carbon nanotube with ease. It uses an inexpensive porous carbonaceous material, thus carbon nanotube can be manufactured at an extremely low cost.

DESCRIPTION OF DRAWING(S) - The figure is a schematic cross sectional view showing an example of a manufacturing apparatus for manufacturing a carbon nanotube.

Container 10
Electrodes 11, 12
Manufacturing apparatus 13
Power supply 18
Permanent magnets 20-22
Thermal shield wall 30
Dwg.1/10

TECH EP 1452486 A2 UPTX: 20040923
TECHNOLOGY FOCUS - MECHANICAL ENGINEERING - Preferred Component: The thermal shield wall including a cooling unit. The electrodes and generation area of the discharge plasma are received in one container (10). The part of the container serves as the thermal shield wall. The container is a sealed container. The manufacturing apparatus further includes atmosphere-adjusting unit for adjusting pressure or **gas** type of an atmosphere inside the sealed container. The discharge plasma generated in the discharge area is **arc** plasma.
TECHNOLOGY FOCUS - IMAGING AND COMMUNICATION - Preferred Component: The

magnets are permanent magnets (20-22) or electromagnets arranged along the flowing direction of the discharge current to surround generation area of the discharge plasma or area close to the generation area. The magnets are arranged to direct the same pole toward the discharging area. The magnets include even number of magnets, preferably at least4. They are formed of one or two coils with center axis approximately aligned to the flowing direction of the discharge current. The voltage applied to the electrodes through power supply is a direct current (DC) voltage. The tip of a cathode of the two electrodes is equal or less than an area of a tip of an anode of the two electrodes. The material of the electrodes is carbon or material that contains carbon Preferred Property: The magnetic flux of the two electrodes at an edge of the tip of the electrode that generates the discharge plasma is 10-5-1 T. The density of the discharge current at the time of generating the discharge plasma is 0.05-15 A/mm2 with respect to an area of the tip of the electrode that generates the discharge plasma. The voltage applied to the electrodes through power supply is 1-30 V. The material of the electrodes has electric resistivity of 0.01-10 ohm.cm.

FS CPI EPI
FA AB; GI; DCN
MC CPI: E05-U02; L03-G05D; L04-E01; L04-E02
EPI: U11-C01B; U11-C01J6; U11-C18A3; U11-C18B1; U11-C18B9; U12-B03D; U12-C01; U12-D02D; U12-E01B2; V05-F05C; V05-F05E5; V05-F08D1; V05-L01A3A

L26 ANSWER 3 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2004-627733 [61] WPIX
DNN N2004-496363 DNC C2004-225792
TI Manufacturing apparatus for manufacturing **carbon** nanotube comprises **electrodes** having tips that are opposed to each other, and power supply that applies voltage between two electrodes to generate discharge plasma.
DC E36 L03 U11 U12 V05
IN ANAZAWA, K; HIRAKATA, M; KISHI, K; SHIMIZU, M; WATANABE, H
PA (XERF) FUJI XEROX CO LTD
CYC 34
PI EP 1452485 A2 20040901 (200461)* EN 22 C01B031-02
R: AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV MC MK NL PT RO SE SI SK TR
JP 2004256373 A 20040916 (200461) 20 C01B031-02
US 2004168904 A1 20040902 (200461) B01J019-08 <--
CN 1524784 A 20040901 (200478) C01B031-02
ADT EP 1452485 A2 EP 2003-20456 20030912; JP 2004256373 A JP 2003-51599 20030227; US 2004168904 A1 US 2003-646834 20030825; CN 1524784 A CN 2003-158782 20030924
PRAI JP 2003-51599 20030227
IC ICM **B01J019-08**; C01B031-02
ICS **B01J019-12**; H01T019-00; H01T023-00; H05F003-00
AB EP 1452485 A UPAB: 20040923
NOVELTY - A manufacturing apparatus (13) comprises at least 2 electrodes (11,12) having tips that are opposed to each other, and power supply (18) that applies a voltage between the two electrodes to generate discharge plasma in a discharge area between the two electrodes. The electrode(s) is made of porous carbonaceous material.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a method for manufacturing a carbon nanotube comprising applying a voltage between two electrodes with tips that are opposed to each other, generating discharge plasma in a discharge area between the two electrodes, and using an electrode made of porous carbonaceous material as electrodes having tips that are opposed to each other.

USE - For manufacturing a carbon nanotube (claimed) for field electron emitting source, diode or transistor.

ADVANTAGE - The invention is capable of manufacturing a relatively high purity carbon nanotube with ease. It uses an inexpensive porous carbonaceous material, thus carbon nanotube can be manufactured at an extremely low cost.

DESCRIPTION OF DRAWING(S) - The figure shows a schematic cross sectional view showing an example of a manufacturing apparatus for manufacturing a carbon nanotube.

Reaction container 10
Electrodes 11, 12
Manufacturing apparatus 13
Vacuum pump 14
Gas cylinder 17
Power supply 18
Valve 19
Permanent magnets 20-22
Dwg.1/10

TECH EP 1452485 A2 UPTX: 20040923
TECHNOLOGY FOCUS - ORGANIC CHEMISTRY - Preferred Component: The porous carbonaceous material is binchotan charcoal or bamboo charcoal. The anode of the two electrodes is made of porous carbonaceous material. The manufacturing apparatus further includes magnetic field generating unit that forms in a generation area of discharge plasma a magnetic field having lines of magnetic force in multiple direction, or magnetic field having component in parallel with a flowing direction of a discharge current. The discharge plasma generated in the discharge area is **arc** plasma. Preferred Process: The porous carbonaceous material is previously subjected to a dehydration process. It is a charcoal processed in 850-2500, preferably 1000-2500degreesC. The manufacture of carbon nanotube further includes subjecting the porous carbonaceous material to a dehydration process prior to generation of discharge plasma in the discharge area between the two electrodes, using the electrode made of porous carbonaceous material as anode of the two electrodes, and forming magnetic field having lines of magnetic force in multiple directions or magnetic field having component parallel with a flowing direction of a discharge current in a generation area of the discharge plasma.

FS CPI EPI
FA AB; GI; DCN
MC CPI: E05-U02; L03-G05D; L04-E01; L04-E02
EPI: U11-C01B; U11-C01J6; U11-C18A3; U11-C18B1; U11-C18B9; U12-B03D; U12-C01; U12-D02D; U12-E01B2; V05-F05C; V05-F05E5; V05-F08D1; V05-L01A3A

L26 ANSWER 4 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2003-662502 [62] WPIX
DNC C2003-179986
TI Production of clean burning **liquid** fuel, for automobiles, involves activating submerged **electric arc** between **carbon** base **electrodes** to produce combustible **gas**, which is transmitted to tower for catalytic processing.
DC H06 J03
IN SANTILLI, R M
PA (SANT-I) SANTILLI R M; (HADR-N) HADRONIC PRESS INC
CYC 1
PI US 2003133855 A1 20030717 (200362)* 13 C10L005-00
US 6663752 B2 20031216 (200382) B01J019-08 <--
ADT US 2003133855 A1 US 2001-970405 20011003; US 6663752 B2 US 2001-970405 20011003

PRAI US 2001-970405 20011003
IC ICM **B01J019-08**; C10L005-00
ICS C10L001-02
AB US2003133855 A UPAB: 20030928
NOVELTY - Production of clean burning **liquid** fuel plus heat from a **liquid feedstock** involves activating submerged **electric arc** between **carbon**-base **electrodes** to produce a combustible **gas** which bubbles to a surface of the **liquid feedstock** transmitting the combustible **gas** via high pressure pipes into a tower for further catalytic processing into a clean burning **liquid** fuel.

DETAILED DESCRIPTION - Production of clean burning **liquid** fuel plus heat from a **liquid feedstock** involves providing a pressure resistant vessel containing a **liquid feedstock**, the vessel housing a submerged **electric arc** between **carbon**-base **electrodes**; activating the submerged **electric arc** between **carbon** -base **electrodes** to produce a combustible **gas** which bubbles to a surface of the **liquid feedstock** transmitting the combustible **gas** via high pressure pipes into a tower (201) for further catalytic processing into a clean burning **liquid** fuel; complementing the catalytic process with the addition of natural elements missing in the original **liquid feedstock** as needed to reach a desired composition of the clean burning **liquid** fuel; further processing the clean burning **liquid** fuel by cryogenic cooling to ambient temperature, separation and filtration, removal of polluting substances, and adding additives to increase octanes, energy content and oxygen output in combustion; and recovering and using heat produced by the thermochemical reactions for the production of the combustible **gas** and a heat produced by the liquefaction of the clean burning **liquid** fuel. The combustible **gas** has a structure of **gaseous** electromagnecules comprising clusters of isolated atoms, dimers and ordinary molecules under internal attractive forces originating from electric and magnetic polarizations of the orbitals of peripheral atomic electrons. The clean burning **liquid** fuel has **liquid** electromagnecules comprising clusters of hydrogen, carbon and oxygen atoms, dimers of OH, CH and CO in single or double valence bonds, and ordinary molecules CH2 plus traces of CO in triple valence bond, H2, O2 and other molecules, under internal attractive forces originating from electric and magnetic polarizations of the orbitals of peripheral atomic electrons, to prevent the formation of CH2 hydrocarbon chains while preserving similar energy content with consequential improved environmental quality of a combustion exhaust. The heat produced by the thermochemical reactions for the production of the combustible **gas** and the heat produced by the liquefaction of the clean burning **liquid** fuel are more than sufficient for the production of steam to power a turbine electric generator for the self-generation of electricity needed to operate the submerged **electric arc** . The **liquid feedstock** is crude oil, oil-base waste, or water-base waste.

USE - For producing a clean burning **liquid** fuel (MagneFuel (RTM)) for automobiles.

ADVANTAGE - The MagneFuel (RTM) has an energy content similar to that of gasoline. The exhaust of MagneFuel (RTM) combustion is cleaner than that of gasoline by surpassing the requirements of the Environmental Protection Agency (EPA) without requiring a catalytic converter. MagneFuel (RTM) reduces the use of atmospheric oxygen as occurring in gasoline combustion. MagneFuel (RTM) combustion reduces the emission of

carcinogenic or other toxic substance. MagneFuel (RTM) is cost competitive with respect to fossil fuels, and can be produced anywhere desired via the processing with equipment identified below of crude oil and inextinguishable oil-base or water-base **liquid** wastes as **feedstock**. The process for the production of MagneFuel (RTM) is self-sustaining, i.e. it produces the electrical energy needed for its own operation.

DESCRIPTION OF DRAWING(S) - The figure depicts a catalytic liquefaction tower, as used in the above process.

Coolant 8
Tower 201
Catalysts 205
Blades 208
Shaft 209
Dwg.2/3

TECH US 2003133855 A1UPTX: 20030928
TECHNOLOGY FOCUS - CHEMICAL ENGINEERING - Preferred Method: The submerged **electric arc** is powered by a direct current (DC) electrical current produced by an alternating current (AC)-DC rectifier, the rectifier in turn being powered by the electric generator in AC mode. The DC electricity produced by the electric generator in excess to that needed to power the submerged **electric arc** is used for electrolytic separation of water into hydrogen and oxygen **gases**. The oxygen and hydrogen **gases** are fed into the catalytic process to respectively enrich oxygen and hydrogen contents of the clean burning **liquid** fuel. The turbine powered electric generator is partially fueled by the combustible **gas** or clean burning **liquid** fuel. The coolant (8) used to cool the **liquid feedstock** and the catalytic process is fresh water or seawater. The stream produced by the turbine is cooled and filtered to produce drinking water.

FS CPI
FA AB; GI
MC CPI: H06-B01; J03-X

L26 ANSWER 5 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2003-568037 [53] WPIX
DNN N2003-451661 DNC C2003-153294
TI Gas production apparatus for increasing gas specific density and energy content has mechanism to fill up pressure resistant piping system, pairs of electrodes, electric power delivery unit, gas recirculating unit, and gas collector.
DC L03 Q73 X16
IN SANTILLI, R M
PA (HADR-N) HADRONIC PRESS INC
CYC 1
PI US 2003113597 A1 20030619 (200353)* 28 H01M008-04
ADT US 2003113597 A1 US 2001-20091 20011214
PRAI US 2001-20091 20011214
IC ICM H01M008-04
ICS B01J019-08; B01J019-12; F23B001-00; H05F003-00
AB US2003113597 A UPAB: 20030820
NOVELTY - Gas production apparatus for increasing a specific density and an energy content of a gas has a mechanism to fill up a pressure resistant piping system with a gas, pair(s) of electrodes, an electric power delivery unit, a gas recirculating unit, and gas collector. The resulting processed gas has greater specific density and energy content than a gas originally filled into the piping system.

DETAILED DESCRIPTION - Gas production apparatus for increasing a specific density and an energy content of a gas comprises a pressure

resistant piping system (5) equipped with on-off pressure valves (6-9), a mechanism to fill up the piping system with a gas and mechanism for compressing the gas to a desired pressure, at least one pair of electrodes (1-4) placed within the piping system and capable of delivering an electric arc (20) within an interior of the piping system, an electric power delivery unit to deliver an electric power to each electrode, a gas recirculating unit to recirculate the gas through the electric arc, and a gas collector to collect a resultant processed gas. The resulting processed gas has greater specific density and energy content than a gas originally filled into the piping system.

INDEPENDENT CLAIMS are also included for:

(a) a method of increasing the voltage, power, and efficiency of a fuel cell, which comprises operating the fuel cell with a processed gas which has a specific density and an energy content bigger than corresponding values of an original gas prior to being processed; and

(b) a method of operating an internal combustion engine with a decreased need for atmospheric oxygen, which comprises operating the engine with a processed fuel made from a processed hydrogen gas having a specific density and energy content greater than a corresponding value for conventional hydrogen gas.

USE - The apparatus is used for producing a gas or for increasing a specific density and an energy content of a gas, e.g. hydrogen, a non-combustible gas, oxygen, a gaseous hydrocarbon fuel, or a liquid vapor (claimed). It is particularly used for producing hydrogen gas which is useful as a primary alternative fuel for the large scale replacement of gasoline and other fossil fuels via its use as automotive fuel or in fuel cells.

ADVANTAGE - The inventive apparatus is capable of producing new forms of hydrogen and oxygen with **magnecular** structure with increase in voltage, power, and efficiency of fuel cells; and for producing hydrogen, oxygen, and other gases with large multiple value of their standard specific density, and consequential increase of their energy content per cubic foot.

DESCRIPTION OF DRAWING(S) - The figure depicts an application of the invention.

Electrodes 1-4

Piping system 5

On-off pressure valves 6-9

Electric arc 20

Dwg.7/16

TECH US 2003113597 A1UPTX: 20030820

TECHNOLOGY FOCUS - MECHANICAL ENGINEERING - Preferred Apparatus: The electric current of the arc is continuous, alternating, or pulsing.

TECHNOLOGY FOCUS - CHEMICAL ENGINEERING - Preferred Method: The processed gas is made by recirculating the original gas in a pressure resistant piping system by compressing the original gas to a desired pressure, and by subjecting the recirculated gas to generated electric arcs created by at least one pair of electrodes within an interior of the piping system. The processed gas is MagH when hydrogen is the original gas and MagO when oxygen is the original gas. It is separated using a mechanism for cryogenically liquefaction of remaining components. Preferred Components: The processed fuel includes the processed hydrogen gas in the presence of carbon and oxygen, and the processed hydrogen is MagH.

FS CPI EPI GMPI

FA AB; GI

MC CPI: L03-E04

EPI: X16-C09; X16-C15

L26 ANSWER 6 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2003-056719 [05] WPIX
DNN N2003-043807
TI Carbon nanotubes formation method for nanoprobing applications, involves vibrating cathode, while establishing electrical **arc** between anode and cathode to deposit carbon material on cathode.
DC S03 U12 V05
IN LAL, A
PA (WISC) WISCONSIN ALUMNI RES FOUND
CYC 1
PI US 6451175 B1 20020917 (200305)* 11 B01J019-08 <--
ADT US 6451175 B1 US 2000-638674 20000815
PRAI US 2000-638674 20000815
IC ICM **B01J019-08**
AB US 6451175 B UPAB: 20030121
NOVELTY - An electrical **arc** is established between a carbon anode (22) and a cathode (24) to deposit carbon material including carbon nanotubes on cathode. The cathode is longitudinally vibrated, while establishing the **arc** so that the carbon material is deposited on the cathode.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for carbon nanotubes formation apparatus.

USE - For forming carbon nanotubes for e.g. atomic force microscopes, used to probe deep crevices on integrated circuit, nanostructures and biological molecules.

ADVANTAGE - The **vibration** of the cathode results in high acceleration of the cathode face to dislodge the larger non-nanotube amorphous particles from the face surface, while allowing lighter carbon nanotubes to remain attached to the surface, thereby enhancing the proportions of nanotubes retained on cathode and avoiding mechanical damage to cathode due to scraping. The economy and efficiency of the production of carbon nanotubes can be significantly increased, while allowing for the formation of nanotubes having longer lengths. The nanotubes formation can be carried out without requiring periodic labor intensive halting to remove **carbon** material from **electrodes.**

DESCRIPTION OF DRAWING(S) - The figures show the schematic views of the nanotubes producing apparatus and the manner in which the **vibration** of the cathode face produces **gas** vertices which serves to stabilize the **arc.**
Carbon anode 22
Cathode 24
Dwg.3, 5/7
FS EPI
FA AB; GI
MC EPI: S03-E02F3; U12-B03F2A; V05-F01A5; V05-F01B3; V05-F04B6A

L26 ANSWER 7 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2002-387537 [42] WPIX
DNC C2002-109442
TI Process for water treatment has carbon electrode for producing **arc** and spark discharges that decomposes coarse water particles into atomic hydrogen.
DC D15
PA (TAKA-I) TAKARADA M
CYC 1
PI JP 2002052392 A 20020219 (200242)* 12 C02F001-48
ADT JP 2002052392 A JP 2000-278916 20000809
PRAI JP 2000-278916 20000809

IC ICM C02F001-48
ICS **B01J019-08**

AB JP2002052392 A UPAB: 20020704
NOVELTY - A process tower (2) contains a mist or rain of raw water particles falling through a **gas**. A pair of power supply units (7,8) supply power to **carbon electrodes** (3) arranged in the process tower to produce a spark and **arc** discharge. The particles decompose into atomic hydrogen and contacts with the carbon evaporated from the **electrode** tip during **arc** discharge.

DETAILED DESCRIPTION - A process tower (2) contains a mist or rain of raw water particles of 0.1-3 mm diameter falling through a **gas**, e.g. air, nitrogen, CO2, argon. A pair of power supply units (7,8) supply power 220 or less V DC or 5-100 kV AC to **carbon electrodes** (3) arranged 2-30 mm apart in the process tower to produce a spark and **arc** discharge. The particles are irradiated by heat and light, decomposes into atomic hydrogen and contacts with the carbon evaporated from the **electrode** tip during **arc** discharge.

USE - Water treatment.

ADVANTAGE - Since the coarse particulates in the water are decomposed into atomic hydrogen, metal ions are eliminated and a pure water is obtained. By generating **arc** discharge chlorine content in water is removed.

DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of the water treatment unit. (Drawing includes non-English language text).
Process tower 2
Power supply units 7,8
Dwg.1/4

FS CPI
FA AB; GI
MC CPI: D04-A01M; D04-A01P

L26 ANSWER 8 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2002-055242 [07] WPIX
DNC C2002-015758
TI Fullerene production, for e.g. carbon nanotubes, comprises forming **arc** discharge between pair of **carbon** rod **electrodes**, and supplying **gas** containing carbon between pair of electrodes.
DC E15 E36
IN ATA, M; KAJIURA, H; MIYAKOSHI, M; SHIRAISHI, M; YAMADA, A
PA (SONY) SONY CORP; (ATAM-I) ATA M; (KAJI-I) KAJIURA H; (MIYA-I) MIYAKOSHI M; (SHIR-I) SHIRAISHI M; (YAMA-I) YAMADA A
CYC 95
PI WO 2001079113 A1 20011025 (200207)* JA 30 C01B031-02
RW: AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW
W: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW
AU 2001048785 A 20011030 (200219) C01B031-02
EP 1203752 A1 20020508 (200238) EN C01B031-02
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
KR 2002025074 A 20020403 (200266) C01B031-02
CN 1366508 A 20020828 (200282) C01B031-02
US 2003015414 A1 20030123 (200310) D01F009-12

JP 2001576381 X 20030722 (200350) C01B031-02

ADT WO 2001079113 A1 WO 2001-JP3327 20010418; AU 2001048785 A AU 2001-48785 20010418; EP 1203752 A1 EP 2001-921889 20010418, WO 2001-JP3327 20010418; KR 2002025074 A KR 2001-715933 20011211; CN 1366508 A CN 2001-800959 20010418; US 2003015414 A1 WO 2001-JP3327 20010418, US 2001-18717 20011218; JP 2001576381 X JP 2001-576381 20010418, WO 2001-JP3327 20010418

FDT AU 2001048785 A Based on WO 2001079113; EP 1203752 A1 Based on WO 2001079113; JP 2001576381 X Based on WO 2001079113

PRAI JP 2000-116377 20000418

IC ICM C01B031-02; D01F009-12

ICS **B01J019-08**; C07C001-00; C07C002-00; C07C004-00; C07C005-00; C07C006-00; D01C005-00

AB WO 200179113 A UPAB: 20020130

NOVELTY - The manufacture of fullerenes comprises forming an **arc** discharge between a pair of **carbon** rod **electrodes**, and supplying **gas** containing carbon between the pair of electrodes.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a device for manufacturing fullerenes which has a pair of **carbon** rod **electrodes** and a **gas** supply for continuous supply of a **gas** containing **carbon** between the **electrodes**.

USE - Used to produce fullerenes, especially carbon nanotubes.

ADVANTAGE - The fullerenes are produced in high yield on a large scale by a simple method.

DESCRIPTION OF DRAWING(S) - The figure shows the carbon nanotube manufacturing device.

Carbon rod **electrodes** 1,2
Reactor 3
Power source 4
Arc discharge 5
Methane **gas** 6
Hydrogen **gas** 7
Gas supply tube 8
Thiophene tank 9
Thiophene 10
Nozzle 11
Gas outlet 12
Dwg.1/5

TECH WO 200179113 A1UPTX: 20020130

TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Method: The **gas** containing carbon is supplied continuously, and contains methane and sulfur such as hydrogen sulfide. The **gas** containing carbon is made to contain sulfur by passing through or bubbling through thiophene. Hydrogen and/or inert **gas** can also be supplied. The carbon rod electrode which forms the positive electrode contains a catalyst metal selected from cobalt, nickel, scandium, vanadium, chromium, manganese, iron, copper, yttrium, zirconium, niobium, molybdenum, palladium, tantalum, tungsten, gold, thorium, uranium, lanthanum, cerium, praseodymium, neodymium, gadolinium, terbium, dysprosium, holmium, erbium, thulium and/or lutetium.

ABEX WO 200179113 A1UPTX: 20020130

EXAMPLE - Hydrogen and methane were mixed at a volume ratio of 5:1 and supplied to a reactor at 100 ml/minute. The pressure in the reactor was maintained at 1.33 x 10 power 3 Pascal. Between the pair of carbon rod electrodes, a DC voltage of 25 volts was applied and a reaction was carried out for 45 minutes. The current generated between the electrodes was 150 A. Hydrogen and methane were supplied directly to the reactor. The positive carbon rod electrode contained Co/Ni in a 1.2/1.2 ratio (mol.%).

FS CPI

FA AB; GI; DCN
MC CPI: E05-U02; N02-A; N02-B; N02-C; N02-D; N02-E04; N02-F02; N03-A; N03-B02; N03-C; N03-D; N03-E

L26 ANSWER 9 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2001-435394 [47] WPIX
DNN N2001-322657 DNC C2001-131758
TI Manufacture of mono layer carbon nano tube, involves adjusting pressure of inert **gas**, according to diameter of nano tube which is to be formed.
DC E36 L02 V05
PA (ISEE) ISE ELECTRONICS CORP
CYC 1
PI JP 2001048510 A 20010220 (200147)* 7 C01B031-02
ADT JP 2001048510 A JP 1999-219005 19990802
PRAI JP 1999-219005 19990802
IC ICM C01B031-02
ICS **B01J019-08**
AB JP2001048510 A UPAB: 20010822
NOVELTY - A preset metal and carbon are evaporated in an inert **gas** atmosphere, to form a monolayer carbon nano tube. The pressure of the inert **gas** is adjusted according to the diameter of the nano tube to be formed.
USE - Carbon nanotubes are useful as **gas** occlusion materials, secondary battery electrode materials, capacitor electrode materials or electron emission materials.
ADVANTAGE - The diameter of carbon nano tube is controlled simply and effectively. The diameter of the carbon nano tube is uniform.
DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of the manufacture of the carbon nano tube.
(Drawing includes non-English language text).
Air tight container 101
Carbon electrodes 102,103
Dwg.1/5
TECH JP 2001048510 AUPTX: 20010822
TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Method: A carbon electrode containing a preset metal (102) and another carbon electrode (103), are provided oppositely in an air-tight container (101) which is under vacuum. An inert **gas** is introduced into the container and its pressure is adjusted corresponding to the diameter of the nano tube to be obtained. An **arc** discharge is generated between the electrodes and the metal present in the electrode is evaporated. The inert **gas** is helium. The metal is an alloy of nickel and yttrium, lanthanum, cerium, terbium, iron and/or lutetium, preferably nickel and iron or an alloy chosen from lutetium-palladium, rhodium-palladium, lutetium-rhodium, palladium-platinum, lutetium-platinum and rhodium-platinum. A hole is provided in the electrode (102) in a longitudinal direction, and a powder containing a metal oxide powder and/or carbon powder is packed in the hole.
FS CPI EPI
FA AB; GI; DCN
MC CPI: E05-U02; E31-N03; L02-H04
EPI: V05-L05B5

L26 ANSWER 10 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2001-334770 [35] WPIX
DNC C2001-103350
TI Aqua-fuel production comprises use of flexible and tough **carbon** fiber bundle **electrodes** in water, and applying voltage to

generate **arc** and produce aqua-fuel containing hydrogen and carbon monoxide.
DC A97 E36 J03
IN CHEN, S; LEE, C; TAI, N
PA (NASC-N) NAT SCI COUNCIL
CYC 1
PI US 6217713 B1 20010417 (200135)* 7 B01J019-08 <--
ADT US 6217713 B1 US 1998-108976 19980702
PRAI US 1998-108976 19980702
IC ICM **B01J019-08**
AB US 6217713 B UPAB: 20010625
NOVELTY - Production of aqua-fuel comprises using flexible and tough carbon fiber bundle (16) electrodes in water and applying 20-30 V to the electrodes to generate an **arc** and produce an aqua-fuel containing hydrogen and carbon monoxide.
USE - Production of aqua-fuel by auto-**feeding** a flexible carbon fiber bundle electrode in an electrolytic reaction.
ADVANTAGE - Due to their flexibility, the carbon fiber bundles can be wound into a coil and used sustainedly over a long period of time, overcoming the problem of electrode supplement. The bundle can be fed sustainedly by an auto-**feeding** apparatus, allowing the continuous production of aqua-fuel over a long period of time.
DESCRIPTION OF DRAWING(S) - The figure shows a schematic view of an auto-**feeding** apparatus.
Carbon fiber bundle 16
Dwg.3/3
TECH US 6217713 B1 UPTX: 20010625
TECHNOLOGY FOCUS - INORGANIC CHEMISTRY - Preferred Electrodes: The **carbon** fiber bundle **electrodes** are formed of a material pultruded with a carbon fiber bundle containing thousands of carbon fibers each having a diameter of 5-15 microns, and is impregnated with resins. The bundle electrode has a cross-section shape and size for auto-**feeding** and promoting the productivity of aqua-fuel. Electrode preparation comprises pultrusion. The carbon fiber bundle is carbonized at 1000-2200 degrees C in a high purity inert atmosphere, and graphitizing the electrode at greater than 2200 degrees C in a high purity inert atmosphere.

TECHNOLOGY FOCUS - POLYMERS - Preferred Resins: The resins used for impregnating the carbon fiber bundle electrode includes thermosetting resins, preferably phenolic, furan, epoxy unsaturated polyester or polyimide resins, or thermoplastic resins, preferably polyetheretherketone, petroleum pitch, coal tar pitch, polystyrene, polyvinyl alcohol or polyacrylonitrile resins.
FS CPI
FA AB; GI; DCN
MC CPI: A99-A; E11-N; E31-A01; E31-N04B; E31-N04D; J03-B

L26 ANSWER 11 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 2000-548572 [50] WPIX
DNC C2000-163684
TI Reactor for **liquid** gasification comprises reaction chamber with reflecting inner surface, and **carbon electrodes**, and electrical current supplier.
DC H06 J04
IN DAMMANN, W A; WALLMAN, W D
PA (DAMM-I) DAMMANN W A; (WALL-I) WALLMAN W D
CYC 1
PI US 6113865 A 20000905 (200050)* 6 B01J019-08 <--

ADT US 6113865 A Provisional US 1998-73818P 19980205, US 1999-244602 19990204
PRAI US 1998-73818P 19980205; US 1999-244602 19990204
IC ICM **B01J019-08**
AB US 6113865 A UPAB: 20001010
NOVELTY - The **liquid** gasification reactor comprises a reaction chamber with a reflecting inner surface, and a pair of spaced-apart **carbon electrodes** for immersion in the **liquid** contained in the reaction chamber. An electrical current supplier supplies current to the electrodes to create an **electrical arc** between the **electrodes**.
DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a reactor similar to that above, having a pressurized reaction chamber.
USE - Reactor for **liquid** gasification process, particularly for use in rapid oxidation to produce a **gas** for use as a fuel from water and carbon.
ADVANTAGE - The efficiency of the electro-thermal chemical reaction is improved. The reaction chamber is reflective and spherical in shape.
DESCRIPTION OF DRAWING(S) - The figure shows a top view of the reaction chamber with the **arc** in the center of the sphere.
Dwg.2/3
FS CPI
FA AB; GI
MC CPI: H06-A; J04-X

L26 ANSWER 12 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 1999-604804 [52] WPIX
DNC C1999-176294
TI Manufacture of carbon monolayer nano tube - involves generating an alternating current **arc** between two **carbon electrodes** coated with metal in **gas** atmosphere, and vaporizing metal and carbon.
DC E36 L02
IN KOBAYASHI, H; NAWAMAKI, K; TSUBOI, T
PA (FUTK) FUTABA DENSHI KOGYO KK
CYC 4

PI	JP 11263609	A	19990928 (199952)*	10	C01B031-02
	JP 3017161	B2	20000306 (200016)	10	
	KR 99077943	A	19991025 (200052)		C01B031-02
	US 6149775	A	20001121 (200101)		B01J019-08 <--
	TW 486381	A	20020511 (200323)		B01J019-08 <--
	KR 358972	B	20021101 (200329)		C01B031-02

ADT JP 11263609 A JP 1998-82409 19980316; JP 3017161 B2 JP 1998-82409 19980316; KR 99077943 A KR 1999-8897 19990316; US 6149775 A US 1999-264685 19990309; TW 486381 A TW 1999-103562 19990309; KR 358972 B KR 1999-8897 19990316
FDT JP 3017161 B2 Previous Publ. JP 11263609; KR 358972 B Previous Publ. KR 99077943
PRAI JP 1998-82409 19980316
IC ICM **B01J019-08**; C01B031-02
AB JP 11263609 A UPAB: 19991210
NOVELTY - Two **carbon electrodes**, which are coated with two or more metals, is applied with alternating voltage and an alternating current (AC) **arc** discharge is generated between the electrodes in an inert **gas** atmosphere. The soot containing carbon and metal evaporated from the **electrodes**, forms the **carbon** monolayer nano tube.
USE - None given.
ADVANTAGE - Carbon monolayer nano tubes having long term stability is formed efficiently.

Dwg.0/6
FS CPI
FA AB; DCN
MC CPI: E31-N03; L02-H04

L26 ANSWER 13 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 1995-199621 [26] WPIX
DNN N1995-156829 DNC C1995-092250
TI Gasification appts. for biomass solution - comprises reaction chamber partially filled with biomass solution of water and carbon, pair of spaced apart **carbon electrodes** in chamber, etc..
DC E36 H06 J03 Q52 X22
IN DAMMANN, W A; WALLMAN, W D
PA (DAMM-I) DAMMANN W A; (WALL-I) WALLMAN W D
CYC 8

PI	US 5417817	A	19950523 (199526)*	6	F02B043-08
	GB 2290303	A	19951220 (199603)	16	C10J003-00
	DE 19517337	A1	19951221 (199605)	7	C10J003-18
	NZ 270991	A	19951221 (199606)		C10J003-18
	AU 9517755	A	19951221 (199607)		C02F001-48
	FR 2721307	A1	19951222 (199607)	13	C01B003-02
	JP 08003572	A	19960109 (199610)	6	C10J003-00
	CA 2144248	A	19951216 (199615)		C25B001-04
	AU 684908	B	19980108 (199810)		C02F001-48
	GB 2290303	B	19980415 (199817)		C10J003-00
	JP 3208414	B2	20010910 (200155)	5	C10J003-00
	DE 19517337	C2	20030410 (200327)		C10J003-18

ADT US 5417817 A US 1994-259878 19940615; GB 2290303 A GB 1995-8414 19950425; DE 19517337 A1 DE 1995-1017337 19950511; NZ 270991 A NZ 1995-270991 19950426; AU 9517755 A AU 1995-17755 19950427; FR 2721307 A1 FR 1995-6058 19950522; JP 08003572 A JP 1995-135750 19950510; CA 2144248 A CA 1995-2144248 19950309; AU 684908 B AU 1995-17755 19950427; GB 2290303 B GB 1995-8414 19950425; JP 3208414 B2 JP 1995-135750 19950510; DE 19517337 C2 DE 1995-1017337 19950511
FDT AU 684908 B Previous Publ. AU 9517755; JP 3208414 B2 Previous Publ. JP 08003572
PRAI US 1994-259878 19940615
IC ICM C01B003-02; C02F001-48; C10J003-00; C10J003-18; C25B001-04; F02B043-08
ICS **B01J019-08**; C01B003-24; C01B003-34; C10J003-20; C10J003-72; C10L003-00; C10L003-08; C25B001-00; C25B003-02
AB US 5417817 A UPAB: 19950705
The appts. for the gasification of a biomass **liquid** solution comprises a reaction chamber partially filled with a biomass solution of water and carbon. A pair of spaced apart **carbon electrodes** are located in the reaction chamber immersed in the biomass solution. The appts. also has a means for creating an **electric arc** between the **electrodes** by supplying a direct electrical current to the electrodes and a switch means interposed between the source of electrical current and electrodes for selectively switching polarity of the current supplied to the electrode.

Also claimed is a process for the gasification of a **liquid** biomass solution.

USE - The **gas** generated, CO and H2, is of use as fuel, e.g. for an internal combustion engine, and as a chemical raw material.

ADVANTAGE - The electrodes are continuously replenished without the need for replacement with disruption of the reaction.

Dwg.2/2
FS CPI EPI GMPI

FA AB; GI; DCN
MC CPI: E11-N; E31-A01; H06-B; J03-B
EPI: X22-A02

L26 ANSWER 14 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 1995-037697 [06] WPIX
DNN N1995-029879 DNC C1995-016867
TI Rotary reactor for producing active carbon particles in steam atmosphere - comprises feeding electricity to rods in reactor with introduction of carbon dioxide or nitrogen..
DC D15 E36 J01 X25
IN HIRAI, Y
PA (HEIY-N) HEIYO SHOJI KK
CYC 3
PI EP 631980 A1 19950104 (199506)* EN 11 C01B031-08
JP 07010515 A 19950113 (199512) 4 C01B031-10
US 5424039 A 19950613 (199529) 8 B01J019-12 <--
JP 08018805 B2 19960228 (199613) 4 C01B031-10
TW 273594 A 19960401 (199628) G01N025-02
ADT EP 631980 A1 EP 1994-110089 19940629; JP 07010515 A JP 1993-210837 19930629; US 5424039 A US 1994-265387 19940624; JP 08018805 B2 JP 1993-210837 19930629; TW 273594 A TW 1994-111431 19941208
FDT JP 08018805 B2 Based on JP 07010515
PRAI JP 1993-210837 19930629
REP EP 471357; GB 1546437; JP 04097905; US 4127737; US 5089457
IC ICM **B01J019-12**; C01B031-08; C01B031-10; G01N025-02
ICS C01B031-12
AB EP 631980 A UPAB: 19970122
Prodn of active carbon particles (8) by carbonising a carbon based material in a steam atmosphere while feeding electricity to the material in a rotary reactor (7), where large quantities of energy are generated by the arc-discharging effect and the electrical resistance heating effect in the cylindrical reactor. Electrical current is fed to electricity receiving rods (6) on the inner wall (10) of the reactor, equally spaced around its circumference, via electrodes (13) and electrode contacts (19) in the form of a carbon brush. Steam is introduced via a steam inflow pipe (4) through a rotary joint and side wall of the reactor. Gas is introduced similarly via a gas inflow pipe (3).

Also claimed is an appts. for producing active carbon particles as above. The wall (10) is made of a refractory material and is lined with thermal insulation (12) and a steel cylinder (14). In addition to the steam and gas pipes, a waste gas pipe (21) and a temperature sensor (5) also pass through the rotary joint in the side wall.

USE - For the production of active carbon particles.

ADVANTAGE - The articles are produced in a simple structure at a high efficiency without any abnormal increase of temperature. The apparatus can also be used for re-activating used active carbon particles.

Dwg.2/3
FS CPI EPI
FA AB; DCN
MC CPI: D04-A01F; D04-A01M; E11-N; E31-N03; J01-D01; J01-E03C
EPI: X25-X

L26 ANSWER 15 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 1987-179353 [26] WPIX
DNN N1987-134605 DNC C1987-074596
TI Pure silicon production - by plasma smelting in transferred **arc** mode.
DC E36 L03 U11 U12 X15

IN DOSAJ, Y D; RAUCHHOLZ, A W
PA (DOWO) DOW CORNING CORP
CYC 17
PI EP 227023 A 19870701 (198726)* EN 11
R: DE FR GB
US 4680096 A 19870714 (198730) 10
JP 62158110 A 19870714 (198733)
DD 257058 A 19880601 (198842)
ZA 8703624 A 19880815 (198844)
AU 8773219 A 19881124 (198903)
SE 8702065 A 19881120 (198903)
NO 8702143 A 19881219 (198905)
BR 8702801 A 19881227 (198906)
PT 84948 A 19890531 (198925)
ES 2005594 A 19890316 (198940)
SE 460190 B 19890918 (198940)
CN 87104483 A 19881207 (198947)
EP 227023 B 19900314 (199011) EN
R: DE FR GB
DE 3669489 G 19900419 (199017)
SU 1602391 A 19901023 (199127)#
IT 1205116 B 19890315 (199128)#
CA 1298236 C 19920331 (199219)
JP 04053806 B 19920827 (199239) 10 C01B033-02
ADT EP 227023 A EP 1986-117555 19861217; US 4680096 A US 1985-813330 19851226;
JP 62158110 A JP 1986-316141 19861225; ZA 8703624 A ZA 1987-3624 19870520;
ES 2005594 A ES 1987-1517 19870522; SU 1602391 A SU 1987-4202684 19870601;
JP 04053806 B JP 1986-316141 19861225
FDT JP 04053806 B Based on JP 62158110
PRAI US 1985-813330 19851226
REP 2.Jnl.Ref; EP 39417; GB 2108096
IC ICM C01B033-02
ICS **B01J019-08**; C01G000-00; C22B061-00; H01L031-00; H05H001-24
AB EP 227023 A UPAB: 19930922
A silicon production process involves (i) generating a **gas** plasma in a reactor, using a transferred **arc** and a minimum of plasma-forming **gas**; (ii) **feeding** silicon dioxide and solid reductant directly into the plasma; (iii) passing the plasma **gas** and the **feed** into a reaction zone of the reactor; and (iv) recovering molten silicon and **gaseous** by-prods. from the reaction zone.

USE/ADVANTAGE - The process is useful for production of silicon of purity suitable for metallurgical and solar cell applications. Plasma generation by transferred **arc** allows use of a minimal amt.of **gas**, thus avoiding dilution of the reaction medium. Use of a plasma avoids the use of **electric arc** furnace **carbon electrodes**, resulting in a silicon product of at least 98 weight% purity.

1/2
FS CPI EPI
FA AB; DCN
MC CPI: E31-P06A; L04-A01
EPI: U11-A01; U11-B02; U12-A02A2; X15-A02A

L26 ANSWER 16 OF 16 WPIX COPYRIGHT 2005 THE THOMSON CORP on STN
AN 1982-41941E [21] WPIX
TI Activated carbon regeneration appts. - has heating vibrated inclined conduit with stepped surface carrying carbon.
DC E36 J01

IN KIRKUP, W M
PA (ESMI-N) ESMIL LTD
CYC 1
PI GB 2087255 A 19820526 (198221)* 4
PRAI GB 1980-36661 19801114; GB 1981-34345 19811113
IC B01D041-00; B01D053-00
AB GB 2087255 A UPAB: 19930915
The appts. comprises a conduit with top inlet and bottom outlet, and the surface supporting the carbon formed as steps to provide tread surfaces on which the carbon rests separated by risers. The conduit is vibrated and the carbon is heated as it passes down the conduit, pref. by electrical **arcing** through the **carbon** between **electrodes**.

Conduit inclination is pref. adjustable so that treads are substantially horizontal and risers vertical or so that the treads are inclined oppositely to conduit inclination and the risers have **liq** . drainage holes. The vibrator pref. provides linear **vibration** only with adjustable direction and acts on the conduit upper end.

FS CPI
FA AB
MC CPI: E31-N03; J01-D01; J01-E02B; J01-E02D; J04-E05

=> FILE HCAPLU
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FILE COVERS 1907 - 18 Jan 2005 VOL 142 ISS 4
FILE LAST UPDATED: 17 Jan 2005 (20050117/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> D QUE L13
L3 4540 SEA FILE=HCAPLUS ABB=ON (LIQUID? OR GAS OR GASES OR GASEOUS OR FEED?)(S)ELECT?(2A)ARC?
L4 15 SEA FILE=HCAPLUS ABB=ON MAGNECUL?
L5 13416 SEA FILE=HCAPLUS ABB=ON CARBON(2A)ELECTRODES
L6 40 SEA FILE=HCAPLUS ABB=ON L3 AND L5
L7 1252 SEA FILE=HCAPLUS ABB=ON (LIQUID? OR GAS OR GASES OR GASEOUS OR FEED?) AND CARBON(2W)ELECTRODES
L8 85 SEA FILE=HCAPLUS ABB=ON L7 AND ARC?
L9 2 SEA FILE=HCAPLUS ABB=ON (L6 OR L8) AND (IR OR UV OR INFRARED OR INFRA(W)RED OR ULTRA(W)VIOLET OR ULTRAVIOLET OR VIBRATION?)
L10 23 SEA FILE=HCAPLUS ABB=ON (L6 OR L8) AND SPECTR?
L11 3 SEA FILE=HCAPLUS ABB=ON L10 AND (MAGNET? OR SPECTR?)/SC,SX

```
L12           5 SEA FILE=HCAPLUS ABB=ON  L9 OR L11
L13          20 SEA FILE=HCAPLUS ABB=ON  L4 OR L12


=> FILE COMPENDEX
FILE 'COMPENDEX' ENTERED AT 16:17:36 ON 18 JAN 2005
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FILE COVERS 1970 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>

=> D QUE L33
L7          1252 SEA FILE=HCAPLUS ABB=ON  (LIQUID? OR GAS OR GASES OR GASEOUS
                 OR FEED?) AND CARBON(2W)ELECTRODES
L16         4453 SEA FILE=WPIX ABB=ON  (LIQUID? OR GAS OR GASES OR GASEOUS OR
                 FEED?)(S)ELECT?(2A)ARC?
L17         1511 SEA FILE=WPIX ABB=ON  CARBON(2A)ELECTRODES
L18           46 SEA FILE=WPIX ABB=ON  L16 AND L17
L19           86 SEA FILE=WPIX ABB=ON  L7 AND ARC?
L27            0 SEA FILE=COMPENDEX ABB=ON  (L19 OR L18) AND (IR OR UV OR
                 INFRARED OR INFRA(W)RED OR ULTRA(W)VIOLET OR ULTRAVIOLET OR
                 VIBRATION?)
L28            5 SEA FILE=COMPENDEX ABB=ON  L16 AND L17
L29           18 SEA FILE=COMPENDEX ABB=ON  L7 AND ARC?
L30            2 SEA FILE=COMPENDEX ABB=ON  MAGNECUL?
L31            0 SEA FILE=COMPENDEX ABB=ON  (L28 OR L29) AND MOLECULAR STRUCTURE
                 S+NT/CT
L32            3 SEA FILE=COMPENDEX ABB=ON  L29 AND SPECTR?
L33            5 SEA FILE=COMPENDEX ABB=ON  L27 OR L30 OR L31 OR L32


=> FILE JICST
FILE 'JICST-EPLUS' ENTERED AT 16:17:48 ON 18 JAN 2005
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FILE COVERS 1985 TO 17 JAN 2005 (20050117/ED)

THE JICST-EPLUS FILE HAS BEEN RELOADED TO REFLECT THE 1999 CONTROLLED
TERM (/CT) THESAURUS RELOAD.

=> D QUE L40
L7          1252 SEA FILE=HCAPLUS ABB=ON  (LIQUID? OR GAS OR GASES OR GASEOUS
                 OR FEED?) AND CARBON(2W)ELECTRODES
L16         4453 SEA FILE=WPIX ABB=ON  (LIQUID? OR GAS OR GASES OR GASEOUS OR
                 FEED?)(S)ELECT?(2A)ARC?
L17         1511 SEA FILE=WPIX ABB=ON  CARBON(2A)ELECTRODES
L34            1 SEA FILE=JICST-EPLUS ABB=ON  L16 AND L17
L35           11 SEA FILE=JICST-EPLUS ABB=ON  L7 AND ARC?
L36            0 SEA FILE=JICST-EPLUS ABB=ON  MAGNECUL?
L37            3 SEA FILE=JICST-EPLUS ABB=ON  (L34 OR L35) AND SPECTR?
L38            1 SEA FILE=JICST-EPLUS ABB=ON  (L34 OR L35) AND VIBRAT?
L39            1 SEA FILE=JICST-EPLUS ABB=ON  (L34 OR L35) AND (IR OR UV OR
                 INFRARED OR INFRA(W)RED OR ULTRA(W)VIOLET OR ULTRAVIOLET OR
                 VIBRATION?)
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L40 3 SEA FILE=JICST-EPLUS ABB=ON (L36 OR L37 OR L38 OR L39)

=> FILE POLLUAB
FILE 'POLLUAB' ENTERED AT 16:18:05 ON 18 JAN 2005
COPYRIGHT (C) 2005 Cambridge Scientific Abstracts (CSA)

FILE COVERS 1970 TO 11 Jan 2005 (20050111/ED)

=> D QUE L43
L7 1252 SEA FILE=HCAPLUS ABB=ON (LIQUID? OR GAS OR GASES OR GASEOUS OR FEED?) AND CARBON(2W)ELECTRODES
L16 4453 SEA FILE=WPIX ABB=ON (LIQUID? OR GAS OR GASES OR GASEOUS OR FEED?)(S)ELECT?(2A)ARC?
L17 1511 SEA FILE=WPIX ABB=ON CARBON(2A)ELECTRODES
L41 0 SEA FILE=POLLUAB ABB=ON L16 AND L17
L42 0 SEA FILE=POLLUAB ABB=ON L7 AND ARC?
L43 0 SEA FILE=POLLUAB ABB=ON L41 OR L42

=> DUP REM L13 L33 L40
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COPYRIGHT (C) 2005 Japan Science and Technology Agency (JST)
PROCESSING COMPLETED FOR L13
PROCESSING COMPLETED FOR L33
PROCESSING COMPLETED FOR L40
L44 28 DUP REM L13 L33 L40 (0 DUPLICATES REMOVED)

=> D L44 ALL 1-28

L44 ANSWER 1 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2004:632874 HCAPLUS
DN 141:147104
ED Entered STN: 06 Aug 2004
TI Apparatus and method for the conversion of water into a new gaseous and combustible form and the combustible gas formed thereby
IN Klein, Dennis J.; Santilli Ruggero, Maria
PA USA
SO U.S. Pat. Appl. Publ., 42 pp., Cont.-in-part of U.S. Ser. No. 277,841.
CODEN: USXXCO
DT Patent
LA English
IC ICM C25C001-02
NCL 205628000
CC 72-9 (Electrochemistry)
Section cross-reference(s): 47, 51
FAN.CNT 6
PATENT NO. KIND DATE APPLICATION NO. DATE

PI	US 2004149591	A1	20040805	US 2004-760336	20040120
	US 2001038087	A1	20011108	US 2001-826183	20010404
	WO 2003002250	A1	20030109	WO 2002-US3860	20020206
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	US 6689259	B1	20040210	US 2002-65111	20020918
	US 2004074781	A1	20040422	US 2002-277841	20021022
PRAI	US 2001-826183	A2	20010404		
	US 2002-65111	A2	20020918		
	US 2002-277841	A2	20021022		
	US 1994-254377	B1	19940606		
	US 1997-785797	B2	19970121		
	US 1998-15895	B1	19980130		
	US 1998-106170	A2	19980629		
	US 1998-133348	B2	19980813		
	US 1999-372278	A2	19990811		
	US 2000-586926	A2	20000605		
	US 2000-635448	B2	20000810		
	US 2001-896422	A	20010629		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 2004149591	ICM	C25C001-02
	NCL	205628000
US 2004149591	ECLA	B01J004/00; B01J007/00; B01J019/08D2; C01B003/00; C01B013/00; C09D007/12D4; C10L003/00; C10L005/00; C25B104/; C25B009/06; C25B015/00; G21K001/00; H01F001/00
US 2001038087	ECLA	B01J019/08D2; C02F001/46J; C10G015/08; C10L003/00; H05H001/24

AB An electrolyzer which decomps. distilled water into a new fuel composed of hydrogen, oxygen and their mol. and **magnecular** bonds, called HHO. The electrolyzer can be used to provide the new combustible gas as an additive to combustion engine fuels or in flame or other generating equipment such as torches and welders. The new combustible gas is comprised of clusters of hydrogen and oxygen atoms structured according to a general formula H m O n wherein m and n have null or pos. integer values with the exception that m and n can not be 0 at the same time, and wherein said combustible gas has a varying energy content depending on its use.

ST electrolyzer water electrolysis combustible gas

IT Electrodes
(apparatus for conversion of water into new gaseous form comprising anode, cathode and auxiliary electrodes)

IT Magnetic induction
(conversion of water into new gaseous form containing hydrogen and oxygen capable to bond with combustible fuel via)

IT Combustion
(conversion of water into new gaseous form for)

IT Apparatus
Electrolytic cells
(for conversion of water into new gaseous and combustible form)

IT 1333-74-0P, Hydrogen, reactions 7782-44-7P, Oxygen, reactions
12385-13-6P, Hydrogen atomic, reactions 17778-80-2P, Oxygen atomic, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)
(conversion of water into new gaseous and combustible form containing)
IT 7732-18-5, Water, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(electrolysis; conversion of water into new gaseous and combustible form)

L44 ANSWER 2 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2004:791670 HCAPLUS
ED Entered STN: 29 Sep 2004
TI A study of polycarbonyl compounds in magnegases
AU Santilli, R. M.; Aringazin, A. K.
CS Institute for Basic Research, Palm Harbor, FL, 34682, USA
SO Hadronic Journal (2004), 27(3), 331-347
CODEN: HAJODX; ISSN: 0162-5519
PB Hadronic Press
DT Journal
LA English
CC 52 (Electrochemical, Radiational, and Thermal Energy Technology)
AB In this paper we study the structure and thermochem. properties of some new polycarbonyl compds., with particular attention devoted to the study of (CO)n complexes, which are expected to be present in magnegases. The latter are anomalous gases produced by Hadronic Reactors of mol. type (Patented and International Patents Pending) which expose atoms to the extremely intense electromagnetic fields existing at atomic distances from elec. arcs in such a way to create a toroidal distribution of the orbitals of individual atoms, whether isolated or part of a valence bond. Polarized atoms, dimers and mols. then attract each other via opposing magnetic polarities resulting into stable cluster which constitute a new chemical species called Santilli's **magnecules**. Some of the numerous open problems in the study of this intriguing new chemical species are pointed out.
RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Aringazin, A; Hadronic J, cond-mat/0202338 2000, V23, P619 HCAPLUS
(2) Aringazin, A; Hadronic J, physics/0001056 2000, V23, P1 HCAPLUS
(3) Aringazin, A; Hadronic J, physics/0001057 2000, V23, P57 HCAPLUS
(4) Cottrell, T; The strengths of chemical bonds 1958
(5) Institute For Basic Research; http://www.i-b-r.org
(6) Pauling, L; The nature of the chemical bonds 1960
(7) Rossini, F; Circular of the National Bureau of Standards 500 1952
(8) Rossini, F; Selected values of physical and thermodynamical properties of hydrocarbon and related compounds 1953
(9) Santilli, R; Foundations of Hadronic Chemistry with Applications to New Clean Energies and Fuels 2001
(10) Santilli, R; Int J Hydrogen Energy 1999, V24, P943 HCAPLUS
(11) Santilli, R; Int J Hydrogen Energy 2000, V25, P173 HCAPLUS
(12) Santilli, R; J New Energy 1999, V4, P5
(13) Santilli, R; Submitted for publication

L44 ANSWER 3 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2004:791669 HCAPLUS
ED Entered STN: 29 Sep 2004

TI Structure and combustion of magnegases
AU Santilli, R. M.; Aringazin, A. K.
CS Institute for Basic Research, Palm Harbor, FL, 34682, USA
SO Hadronic Journal (2004), 27(3), 299-330
CODEN: HAJODX; ISSN: 0162-5519
PB Hadronic Press
DT Journal
LA English
CC 52 (Electrochemical, Radiational, and Thermal Energy Technology)
AB In this paper we study the novel chemical species of Santilli **magnecules** as contained in magnegases (Patented and International Patents Pending, www.magnegas.com), and confirm that **magnecules** are characterized by clusters generally composed of individual atoms (such as H, O, and C), radicals (such as HO, CH and C-O in single valence bond and C=O in double valence bonds), and conventional mols. (such as H2, CO, CO2, H2O), all these constituents being bonded together by magnetic fields originating from the toroidal polarization of the orbitals of valence and other electrons. We then present, apparently for the first time, ail estimate of the binding energy of **magnecules**. We also study the combustion of gaseous fuels with Santilli **magnecular** structure and show that said combustion is fundamentally different than the combustion of any other fuel. Conventional fuels are constituted by atoms strongly bonded into mols. by ordinary valence bonds, and generally burn according to only one dominant thermochem. reaction. In this sense, the combustion of conventional fuels can be conceived as the firing of a "single stage rocket". Magnegases are instead constituted by atoms, radicals and conventional mols. under a weaker **magnecular** bond, thus having a multi-stage structure. Their combustion generally has a sequence of dominant, thermochem. reactions that can be referred to as the firing of a "multi-stage rocket" with different fuels in different stages. In this paper we study, apparently for the first time, the primary chemical reactions in the combustion of magnegases. Our main conclusion is that fuels synthesized under the intense elec. and magnetic fields of submerged elec. arcs can indeed release energy in amts. much bigger than those permitted by conventional chemical reactions, and have environmentally acceptable exhausts, thus offering serious possibilities to solve our ever increasing energy needs and environmental problems.
RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; http://www.i-b-r.org
(2) Aringazin, A; Hadronic J, physics/0001056 2000, V23, P1 HCAPLUS
(3) Aringazin, A; Hadronic J, physics/0001057 2000, V23, P57 HCAPLUS
(4) Cottrell, T; The strengths of chemical bonds 1958
(5) Kucherenko, M; Hadronic J 1998, V21, P895 HCAPLUS
(6) Pauling, L; The nature of the chemical bonds 1960
(7) Rossini, F; Circular of the National Bureau of Standards 500 1952
(8) Rossini, F; Selected values of physical and thermodynamical properties of hydrocarbon and related compounds 1953
(9) Santilli, R; Foundations of hadronic chemistry With application to new clean energies and fuels 2001
(10) Santilli, R; Hadronic J 1998, V21, P789 HCAPLUS
(11) Santilli, R; Intern J Hydr Energy 1999, V24, P943 HCAPLUS
(12) Santilli, R; J Hydrogen Energy 2000, V25, P173 HCAPLUS
(13) Santilli, R; J New Energy 1999, V4(1)

L44 ANSWER 4 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2003:850285 HCAPLUS
DN 140:10272
ED Entered STN: 30 Oct 2003

TI A novel electrode of CO2 laser with arc thermal spray process
AU Hsieh, Tsang-Yen; Fu, I-Yung; Wang, Nai-Chueh
CS Institute of Optical Sciences, National Central University, Chung-Li, 320, Taiwan
SO Japanese Journal of Applied Physics, Part 1: Regular Papers, Short Notes & Review Papers (2003), 42(10), 6698-6699
CODEN: JAPNDE
PB Japan Society of Applied Physics
DT Journal
LA English
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
AB A novel CO2 laser electrode prepared using an arc thermal spray process is reported. A pair of helical Al layers sprayed on the wall of a SiO2 laser tube served as electrodes for a.c. discharge. The quality of an electrode is affected by the Al wire purity and porosity/oxide content of the coating. Al2O3 grit size affected the surface roughness of the SiO2 tube and the bonding strength between the SiO2 and Al coating. The a.c. power was coupled into sprayed laser electrodes using a parallel resonant inverter to obtain 500 W output power from a fast-axial-flow CO2 laser. The thermal spraying of electrodes is attractive due to its ease of preparation, high reliability, and low cost.
ST electrode carbon dioxide laser arc thermal spray
IT **Gas** lasers
IR lasers
(carbon dioxide; **electrode** with **arc** thermal spray process)
IT **Electrodes**
(of **carbon** dioxide laser with arc thermal spray process)
IT Coating process
(thermal spraying; electrode of carbon dioxide laser with arc)
IT 7429-90-5, Aluminum, uses
RL: DEV (Device component use); USES (Uses)
(electrode of carbon dioxide laser with arc thermal spray process)
RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Sedlacek, V; Metallic Surfaces, Films and Coatings 1992, P35
(2) Steen, W; Laser Material Processing 1991, P15

L44 ANSWER 5 OF 28 JICST-EPlus COPYRIGHT 2005 JST on STN
AN 1030227689 JICST-EPlus
TI Synthesis and Physicality of Carbonaceous Magnetic Materials Prepared by **Arc** Discharge.
AU MATSUYAMA NAOYA; NODA TOMOKI; KAKIZAKI KOICHI; HIRATSUKA NOBUYUKI
CS Saitama Univ., JPN
SO Nippon Oyo Jiki Gakkaishi (Journal of the Magnetics Society of Japan), (2003) vol. 27, no. 4, pp. 375-378. Journal Code: Z0944A (Fig. 7, Ref. 6)
ISSN: 0285-0192
CY Japan
DT Journal; Article
LA Japanese
STA New
AB Organic magnetic materials were fabricated by the **arc** discharge method with starting materials of nitrogen **gas** and triethylamine. After nitrogen **gas** or **gaseous** triethylamine was introduced into the chamber, an **arc** was discharged between **carbon electrodes** with a purity of 99.99%. The as-made samples were annealed in decreased air from 400.DEG.C. to 1000.DEG.C. for 3 hours. The carbonaceous sample prepared in nitrogen

gas was a diamagnetic material, while the sample made from triethylamine was a ferromagnetic-like material whose magnetization was around 0.02 emu/g at room temperature. After annealing between 500.DEG.C. and 600.DEG.C., the magnetization of the ferromagnetic-like material increased by around 3 times as much as that of as-made one. However, the spin density, measured by electron spin resonance, decreased with increasing annealing temperature; in particular, it fell rapidly between 500.DEG.C. and 600.DEG.C.. Therefore, the linewidth of the ferromagnetic-like carbonaceous material after annealing at 500.DEG.C. and 600.DEG.C. was narrower than that of the as-made material, and the intensified spin interaction suggested an increase in the magnetization. (author abst.)

CC BM06070A (537.62:547)

CT **arc** discharge; organic magnet; nitrogen; aliphatic amine; polymer thin film; magnetic thin film; annealing; magnetization; diamagnetism; ferromagnetism; ESR(resonance); spin density; **spectral** linewidth; spin-spin interaction; tertiary amine

BT electric discharge; magnetic substance; magnetic material; material; second row element; element; nitrogen group element; amine; polymer membrane; functional polymer; macromolecule; membrane and film; thin film; heat treatment; treatment; magnetic property; magnetism; magnetic resonance; resonance; density; **spectral** line shape; interaction

L44 ANSWER 6 OF 28 COMPENDEX COPYRIGHT 2005 EEI on STN

AN 2002(51):3752 COMPENDEX

TI The novel **magnecular** species of hydrogen and oxygen with increased specific weight and energy content.

AU Santilli, Ruggero Maria (Institute for Basic Research, Palm Harbor, FL 34682, United States)

SO International Journal of Hydrogen Energy v 28 n 2 February 2002 2003.p 177-196
CODEN: IJHEDX ISSN: 0360-3199

PY 2003

DT Journal

TC Theoretical; Experimental

LA English

AB In this paper we review the new chemical species of **magnecules** introduced in preceding works (see monograph, R.M. Santilli, Foundations of hadronic chemistry with applications to new clean energies and fuels. Boston-Dordrecht-London: Kluwer Academic Publisher, 2001 for a general review), which consist of individual atoms, radicals and ordinary molecules bonded together into stable clusters under a new internal attractive force originating from the toroidal polarization of the orbitals of atomic electrons under strong external magnetic fields. We then introduce, apparently for the first time, the hypothesis of new chemical species of hydrogen, oxygen and other gases with **magnecular** structure called MagneHydrogen[trademark], MagneOxygen[trademark], etc. or MagneH[trademark], MagneO[trademark], etc. for short (international patents pending). We then present the experimental evidence according to which the latter gases possess specific weight and energy content greater than the corresponding values of the same gases with conventional molecular structure. We show that the use of MagneH and MagneO in fuel cells implies: (1) an increase of fuel cells voltage, power and efficiency; (2) a decrease of storage volumes; and (3) a significant decrease in operating costs. The equipment for the industrial production of MagneH and MagneO is identified. We also study a particular form of MagneH with specific weight of about 7 times that of the hydrogen which is particularly suited for use as fuel in internal combustion engines, and show that such a new species implies: (i) the

elimination of liquefaction of conventional hydrogen as currently used by BMW, GM, and other car manufacturers; (ii) performance essentially equivalent to that of the same engine when operating on gasoline; and (iii) the achievement of cost competitiveness of MagneH with respect to fossil fuels, of course, when produced in sufficiently large volumes. We also indicate that the liquefaction of MagneH and MagneO is predicted to cost significantly less than ordinary gases (in view of a mutual attraction among magnetically polarized **magnecules** which does not exist in conventional gases), and that their use as fuel for rocket propulsion is expected to imply a significant increase of the payload, or a corresponding decrease of boosters weight. All the above advances are dependent on the features of the selected equipment for the production of MagneH and MagneO (including electric power, pressure, etc.), as well as the duration of the processing. The paper ends with the indication of other applications of the new chemical species, the solicitation of independent experimental verifications, and the identification of new intriguing open problems. 17 Refs.

CC 804.1 Organic Components; 931.2 Physical Properties of Gases, Liquids and Solids; 931.3 Atomic and Molecular Physics; 701.2 Magnetism: Basic Concepts and Phenomena; 801.4 Physical Chemistry; 612.1 Internal Combustion Engines (General)

CT *Hydrocarbons; Electric power systems; Electrons; Magnetic fields; Molecular structure; Internal combustion engines; Gasoline; Spacecraft propulsion; Density (specific gravity); Free radicals

ST Toroidal polarization

L44 ANSWER 7 OF 28 HCAPLUS

AN 2002:153737 HCAPLUS

DN 136:205602

ED Entered STN: 28 Feb 2002

TI Toroidal configuration of the orbit of the electron of the hydrogen atom under strong external magnetic fields

AU Aringazin, A. K.

CS Dep. Theoretical Physics, Karaganda State Univ., Karaganda, 470074, Kazakhstan

SO Los Alamos National Laboratory, Preprint Archive, Physics (2002) i, 1-38, arXiv:physics/0202049, 19 Feb 2002
CODEN: LNPHF9
URL: http://xxx.lanl.gov/pdf/physics/0202049

PB Los Alamos National Laboratory

DT Preprint; General Review

LA English

CC 65-0 (General Physical Chemistry)
Section cross-reference(s): 77

AB A review. In this paper we overview some results on the hydrogen atom in external static uniform magnetic fields. We focus on the case of very strong magnetic field, B » B0 = 2.3·109 Gauss, use various approx. models and, particularly, in the adiabatic approximation have calculated exactly the integral defining the effective potential. This potential appears to be finite at z = 0. Our consideration of the problem of highly magnetized atoms and mols. is motivated by the recently developed MagneGas technol. by Santilli (http://www.magnegas.com). The ground state electron charge distribution of the hydrogen atom in an intense magnetic field is of a toroidal form, in agreement with that studied by Santilli. This phys. picture is at the foundation of the new chemical species of **magnecules** proposed by Santilli.

ST review hydrogen atom strong magnetic field toroidal orbit

IT Potential energy
(effective; for atomic hydrogen in strong magnetic field)
IT Magnetic field effects
Wave function
(toroidal configuration of orbit of electron of hydrogen atom under strong external magnetic fields)
IT 12385-13-6, Hydrogen atom, properties
RL: PRP (Properties)
(toroidal configuration of orbit of electron of hydrogen atom under strong external magnetic fields)
RE.CNT 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Al-Hujaj, O; chem-ph/0003043
(2) Battye, R; Phys Rev Lett 1998, V81, P4798 HCAPLUS
(3) Battye, R; Proc R Soc Lond 1999, VA455, P4305
(4) Becken, W; chem-ph/9902059
(5) Bezchastnov, V; chem-ph/0006016
(6) Detmer, T; chem-ph/9711003
(7) Detmer, T; chem-ph/9711020
(8) Faddeev, L; Magnetic geometry and the confinement of electrically conducting plasmas 2000
(9) Heyl, J; chem-ph/9806040 1998
(10) Hietarinta, J; Phys Lett 1999, VB451, P60
(11) Hietarinta, J; The ground state in the Faddeev-Skyrme model 1999
(12) Hietarinta, J; http://users.utu.fi/hietarin/knots/index.html
(13) Ivanov, M; chem-ph/0006017
(14) Ivanov, M; chem-ph/9801014
(15) Ivanov, M; chem-ph/9909031
(16) Ivanov, M; chem-ph/9910017
(17) Johnsen, K; chem-ph/9603005 1996
(18) Jones, M; chem-ph/9811041 1998
(19) Kadomtsev, B; JETP 1971, V13, P42
(20) Kadomtsev, B; JETP Lett 1971, V13, P9
(21) Kadomtsev, B; Soviet Phys JETP 1970, V31, P945
(22) Lai, D; chem-ph/0009333 2000
(23) Landau, L; Quantum Mechanics: Non-Relativistic Theory, 3rd ed 1989
(24) Leitner, D; chem-ph/9808020
(25) Lopez, J; chem-ph/9707050
(26) Lopez, J; chem-ph/9911535
(27) Melezhik, V; chem-ph/0006019
(28) Melezhik, V; chem-ph/9909030
(29) Potekhin, A; chem-ph/9710046
(30) Ruder, H; Atoms in Strong Magnetic Fields 1994
(31) Santili, R; Intern J Hadrogen Energy 2000, V25, P173
(32) Santili, R; http://www.magnegas.com
(33) Santilli, R; Hadronic Chemistry, With Applications to New Clean Energies and Fuels, to appear 2001
(34) Santilli, R; Hadronic J 1998, V21, P789 HCAPLUS
(35) Santilli, R; Intern J Hydrogen Energy 1999, V24, P943 HCAPLUS
(36) Santilli, R; The Physics of New Clean Energies and Fuels According to Hadronic Mechanics, Journal of New Energy 1999, P318
(37) Schmelcher, P; chem-ph/0006018
(38) Schmelcher, P; chem-ph/9902060
(39) Schmelcher, P; chem-ph/9909045
(40) Sokolov, A; Quantum mechanics (in Russian) 1979
(41) Turbiner, A; chem-ph/9809298
(42) Watanabe, N; Journal of Physical Society of Japan, chem-ph/0011069 2000, V69(9), P2962 HCAPLUS
(43) Yu, P; Phys Rev Lett 1996, V77, P619

L44 ANSWER 8 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:600146 HCAPLUS
DN 138:6117
ED Entered STN: 13 Aug 2002
TI Laser desorption time-of-flight mass **spectrometry** and **gas** chromatography-mass **spectrometry** analysis of extracts from coal-derived fullerene containing soots
AU Li, Yongfeng; Qiu, Jieshan; Zhou, Ying; Mieno, Testsu
CS Department of Materials Science and Chemical Engineering, Dalian University of Technology, Dalian, 116012, Peop. Rep. China
SO Fenxi Huaxue (2002), 30(7), 769-773
CODEN: FHHHDT; ISSN: 0253-3820
PB Zhongguo Huaxuehui "Fenxi Huaxue" Bianji Weiyuanhui
DT Journal
LA Chinese
CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 51, **73**, 78, 80
AB The d.c. **arc** discharge method was adopted to evaporate the coal-derived **carbon electrodes** to produce soot that contains fullerenes. Organic solvents such as toluene, o-xylene and 1,2,4-trichlorobenzene were used to extract crude fullerenes from the soot obtained from the **arcing** process. The crude fullerenes and byproducts were analyzed using laser desorption time-of-flight mass **spectrometry** and **gas** chromatog.-mass **spectrometry** (GC-MS). It is found that in addition to C60 and C70 fullerenes, higher fullerenes such as C74; C78, C82, C84, C100 and C106 exist in the coal-derived crude fullerenes in relatively high content. The GC-MS anal. results indicate that the oil-like yellow byproducts mainly consist of aromatic hydrocarbons, which may directly come from the recombination of small fragments formed during the **arcing** process of coal-based carbon. It implies that the formation mechanism of fullerenes from coal may be different from that when graphite is used as the starting material. In the case of coal, fullerenes could be directly formed from larger units rather than from C1 and C2 units, in other words, the large polycyclic aromatic carbons ions may act as the precursors in the formation of coal-based fullerenes.
ST fullerene coal derived mass **spectrometry**
IT Polycyclic compounds
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(aromatic hydrocarbons; fullerene formation mechanism in coal-derived **carbon electrodes** by **arc** discharge)
IT Electric **arc**
(fullerene formation mechanism in coal-derived **carbon electrodes** by **arc** discharge)
IT Mass **spectrometry**
(**gas** chromatog. combined with; of exts. from coal-derived fullerene containing soots)
IT Soot
(laser desorption time-of-flight mass **spectrometry** and **gas** chromatog.-mass **spectrometry** anal. of exts. from coal-derived fullerene containing soots)
IT Fullerenes
RL: ANT (Analyte); OCU (Occurrence, unclassified); PNU (Preparation, unclassified); ANST (Analytical study); OCCU (Occurrence); PREP (Preparation)
(laser desorption time-of-flight mass **spectrometry** and **gas** chromatog.-mass **spectrometry** anal. of exts. from

coal-derived fullerene containing soots)
IT Coal, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(laser desorption time-of-flight mass **spectrometry** and **gas** chromatog.-mass **spectrometry** anal. of exts. from coal-derived fullerene containing soots)
IT Time-of-flight mass **spectrometry**
(laser-induced photodesorption; of exts. from coal-derived fullerene containing soots)
IT **Gas** chromatography
(mass **spectrometry** combined with; of exts. from coal-derived fullerene containing soots)
IT Aromatic hydrocarbons, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(polycyclic; fullerene formation mechanism in coal-derived **carbon electrodes** by **arc** discharge)
IT Laser desorption mass **spectrometry**
(time-of-flight; of exts. from coal-derived fullerene containing soots)
IT 7440-44-0, Carbon, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(fullerene formation mechanism in coal-derived **carbon electrodes** by **arc** discharge)
IT 99685-96-8P, C60 Fullerene 115383-22-7P, C70 Fullerene 135113-16-5P, C84 Fullerene 136316-32-0P, C78 Fullerene 136316-33-1P, C100 Fullerene 136846-58-7P, C74 Fullerene 136846-59-8P, C82 Fullerene 136846-63-4P, C106 Fullerene
RL: ANT (Analyte); OCU (Occurrence, unclassified); PNU (Preparation, unclassified); ANST (Analytical study); OCCU (Occurrence); PREP (Preparation)
(laser desorption time-of-flight mass **spectrometry** and **gas** chromatog.-mass **spectrometry** anal. of exts. from coal-derived fullerene containing soots)
IT 95-47-6, o-Xylene, uses 108-88-3, Toluene, uses 120-82-1, 1,2,4-Trichlorobenzene
RL: NUU (Other use, unclassified); USES (Uses)
(laser desorption time-of-flight mass **spectrometry** and **gas** chromatog.-mass **spectrometry** anal. of exts. from coal-derived fullerene containing soots)

L44 ANSWER 9 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2002:893232 HCAPLUS
DN 138:306542
ED Entered STN: 25 Nov 2002
TI The novel **magnecular** species of hydrogen and oxygen with increased specific weight and energy content
AU Santilli, Ruggero Maria
CS Institute for Basic Research, Palm Harbor, FL, 34682, USA
SO International Journal of Hydrogen Energy (2002), Volume Date 2003, 28(2), 177-196
CODEN: IJHEDX; ISSN: 0360-3199
PB Elsevier Science Ltd.
DT Journal; General Review
LA English
CC 52-0 (Electrochemical, Radiational, and Thermal Energy Technology)
AB A review of the new chemical species of **magnecules** which consist of individual atoms, radicals and ordinary mols. bonded together into stable

clusters under a new internal attractive force originating from the toroidal polarization of the orbitals of atomic electrons under strong external magnetic fields. New chemical species of H and O with **magnecular** structures, MagneH and MagneO, is proposed. Exptl. evidence shows that these gases possess a sp. weight and energy content greater than the corresponding values for the same gases with conventional mol. structure. MagneH and MagneO can be used with good effect in fuel cells. The equipment for the industrial production of MagneH and MagneO is identified. A particular form of MagneH, with sp. weight of .apprx.7 times that of H, is particularly suitable for use as fuel in internal combustion engines. The liquefaction of MagneH and MagneO is predicted to cost significantly less than ordinary gases and their use for rocket propulsion is advantageous.

ST review **magnecule** hydrogen oxygen hadronic chem

IT Energy
(review of novel **magnecular** species of hydrogen and oxygen with increased sp. weight and energy content)

IT 1333-74-0, Hydrogen, uses 7782-44-7, Oxygen, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(review of novel **magnecular** species of hydrogen and oxygen with increased sp. weight and energy content)

RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; Liphardt and Associates: Certification of MagneGas Exhaust, http://www.magnegas.com/technology/part5.htm
(2) Aringazin, A; A study of polycarbonyl compounds in MagneGases, submitted for publication
(3) Aringazin, A; A study of the energy efficiency of hadronic reactors of molecular type, submitted for publication
(4) Aringazin, A; Hadronic Journal, in press 2001, P24
(5) Aringazin, A; Structure and combustion of MagneGases, submitted for publication
(6) Aringazin, A; http://www.i-b-r.org/ir00022.htm
(7) Kadomtsev, B; Kudryavtsev VS JETP 1971, V13, P42
(8) Kadomtsev, B; Kudryavtsev VS JETP Letters 1971, V13, P9
(9) Kadomtsev, B; Soviet Physics JETP 1970, V31, P945
(10) Kucherenko, M; Hadronic Journal 1998, V21, P895 HCAPLUS
(11) Landau, L; Quantum mechanics: non-relativistic theory, 3rd ed 1989
(12) Ruder, H; Atoms in strong magnetic fields 1994
(13) Santilli, R; Foundations of hadronic chemistry with applications to new clean energies and fuels 2001
(14) Santilli, R; Hadronic Journal 1998, V21, P789 HCAPLUS
(15) Santilli, R; International Hydrogen Energy Forum 2000, http://http://www.magnegas.com/technology/part4.htm 2000
(16) Santilli, R; International Journal of Hydrogen Energy 1999, V24, P943 HCAPLUS
(17) Santilli, R; International Journal of Hydrogen Energy 2000, V25, P173 HCAPLUS
(18) Sokolov, A; Quantum mechanics (in Russian) 1979

L44 ANSWER 10 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:931286 HCAPLUS
DN 136:219448
ED Entered STN: 27 Dec 2001
TI A study of the energy efficiency of Hadronic Reactors of molecular type
AU Aringazin, A. K.; Santilli, R. M.
CS Institute for Basic Research, Department of Theoretical Physics, Eurasian National University, Astana, 473021, Kazakhstan
SO Los Alamos National Laboratory, Preprint Archive, Physics (2001) 1-25,

arXiv:physics/0112067, 20 Dec 2001
CODEN: LNPHF9
URL: http://xxx.lanl.gov/pdf/physics/0112067
PB Los Alamos National Laboratory
DT Preprint
LA English
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
AB An estimate is attempted of the com. efficiency of Santilli's Hadronic Reactors of the mol. type which convert a liquid feedstock (such as automotive antifreeze and oil waste, city or farm liquid waste, crude oil, etc.) into clean burning Magnegas plus heat acquired by the liquid feedstock. The conversion is done via a new process based on a certain flow of the liquid feedstock through a submerged elec. arc between carbon-base electrodes and other features. The com. efficiency is the ratio between the total energy output (energy in Magnegas plus heat) and the elec. energy used for its production, whereas the scientific efficiency is the usual ratio between the total energy output and the total energy input (the sum of the elec. energy plus the energy in the liquid feedstock as well as that in the carbon electrodes). The scientific efficiency is always less than one because of conservation of energy. However, a peculiar feature of Santilli's mol.-type Hadronic Reactors is that the com. efficiency is considerably greater than one, namely, that the reactors are capable of tapping energy from the liquid feedstock and the carbon rods. Conventional thermochem. does indeed predict a com. efficiency greater than one, although at values considerably smaller than the actual efficiency measured in the reactors, thus indicating the applicability of covering the hadronic chemical from which the reactors received their name. For reactions run at temperature T = 25°C and pressure p = 1 atm, conventional chemical composition of the combustible gas, and conventional thermochem. calcn. processes, an upper limit of com. efficiency of 3.11 was reached using pure water as feedstock, and 3.11-7.5 using a mixture of ethylene glycol and water with increasing relative consumption of ethylene glycol with respect to the consumption of carbon rods. The study of the heat produced by the reactions leads to large divergences between the thermochem. predictions and exptl. data of at least a factor of three. Such divergencies can only be explained with deviations from quantum chemical in favor of the covering hadronic chemical and. In particular, the indicated large divergencies can only be explained with the assumption that the produced combustible gas has the new non-valence chemical structure of Santilli **magnecules**.
ST hadronic reactors energy efficiency
IT Fuel gases
(Magnegas; energy efficiency of Hadronic Reactors of mol. type and Magnegas production)
IT Fuels
Magnetic field effects
Wastes
(energy efficiency of Hadronic Reactors of mol. type and Magnegas production)
IT Nuclear reactors
(hadronic; energy efficiency of Hadronic Reactors of mol. type and Magnegas production)
RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; http://www.usmagnegas.com
(2) Aringazin, A; Hadronic Journal, http://www.arXive.org: physics/0001057 2000, V23, P57 HCAPLUS
(3) Kucherenko, M; Hadronic Journal 1998, V21, P895 HCAPLUS
(4) Kucherenko, M; Hadronic Journal, http://www.arXive.org: physics/0001056

2000, V23, P1 HCAPLUS
(5) Santilli, R; Ab Initio Hadronic Chemistry 2000
(6) Santilli, R; Contributed paper, International Hydrogen Energy Forum 2000, http://www.arXive.org: physics/000904 2000
(7) Santilli, R; Foundations of Hadronic Chemistry with Aopplications to New Clean Energies and Fuels 2001
(8) Santilli, R; International Journal of Hydrogen Energy 1999, V24, P943 HCAPLUS
(9) Santilli, R; International Journal of Hydrogen Energy 2000, V25, P173 HCAPLUS

L44 ANSWER 11 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:931309 HCAPLUS
DN 136:219449
ED Entered STN: 27 Dec 2001
TI A study of polycarbonyl compounds in magnegases
AU Aringazin, A. K.; Santilli, R. M.
CS Institute for Basic Research, Department of Theoretical Physics, Eurasian National University, Astana, 473021, Kazakhstan
SO Los Alamos National Laboratory, Preprint Archive, Physics (2001) 1-17, arXiv:physics/0112068, 20 Dec 2001
CODEN: LNPHF9
URL: http://xxx.lanl.gov/pdf/physics/0112068
PB Los Alamos National Laboratory
DT Preprint
LA English
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
AB The structure and thermochem. properties of some new polycarbonyl compds. are studied, with particular attention devoted to the study of (CO)n complexes which are expected to be present in Magnegases. Magnegases are anomalous gases produced by mol.-type Hadronic Reactors which expose atoms to the extremely intense electron magnetic fields existing at atomic distances from elec. arcs in such a way to create a toroidal distribution of the orbitals of individual atoms, whether isolated or part of a valence bond. Polarized atoms, dimers and mols. then attract each other via opposing magnetic polarities resulting into stable clusters which constitute a new chemical species called "Santilli's **magnecules**". Some of the numerous open problems in the study of this intriguing new chemical species are pointed out.
ST polycarbonyl compd magnegases
IT Fuel gases
(magnegases; polycarbonyl compds. in magnegases)
IT Carbonyl compounds (organic), processes
RL: MSC (Miscellaneous); PEP (Physical, engineering or chemical process); PROC (Process)
(polycarbonyl compds. in magnegases)
IT Fuels
Magnetic field effects
Plasma
(polycarbonyl compds. in magnegases in relation to)
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; http://www.usmagnegas.com
(2) Aringazin, A; Hadronic J, physics/0001056 2000, V23, P1 HCAPLUS
(3) Aringazin, A; Hadronic J, physics/0001057 2000, V23, P57 HCAPLUS
(4) Aringazin, A; To be published
(5) Cottrell, T; The strengths of chemical bonds 1958
(6) Institute For Basic Research; http://www.i-b-r.org
(7) Pauling, L; The nature of the chemical bonds 1960

(8) Rossini, F; Circular of the National Bureau of Standards 500 1952
(9) Rossini, F; Selected values of physical and thermodynamical properties of hydrocarbon and related compounds (American Petroleum Institute Research Project 44) 1953
(10) Santilli, R; Foundations of Hadronic Chemistry with Applications to New Clean Energies and Fuels 2001
(11) Santilli, R; Int J Hydrogen Energy 1999, V24, P943 HCAPLUS
(12) Santilli, R; Int J Hydrogen Energy 2000, V25, P173 HCAPLUS
(13) Santilli, R; Submitted for publication
(14) Santilli, R; The Physics of New Clean Energies and Fuels According to Hadronic Mechanics 1999, V4, P5

L44 ANSWER 12 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:931232 HCAPLUS
DN 136:219447
ED Entered STN: 27 Dec 2001
TI Structure and combustion of Magnegases
AU Santilli, R. M.; Aringazin, A. K.
CS Institute for Basic Research, Palm Harbor, FL, 64382, USA
SO Los Alamos National Laboratory, Preprint Archive, Physics (2001) 1-33, arXiv:physics/0112066, 20 Dec 2001
CODEN: LNPHF9
URL: http://xxx.lanl.gov/pdf/physics/0112066
PB Los Alamos National Laboratory
DT Preprint
LA English
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
AB The authors study the structure and combustion of Magnegases, new clean fuels produced as byproducts of recycling nonradioactive liquid feedstocks such as antifreeze waste, engine oil waste, municipal sewage, crude oil, etc., and generally varying with the liquid used for their production A new technol., PlasmaArcFlow, flows the waste through a submerged elec. arc between conventional electrodes. The arc decomps. the liquid mols. into their atomic constituents, and forms a plasma in the immediate vicinity of the electrodes at about 10,000°F. The technol. then moves the plasma away from the electrodes, and controls its recombination into environmentally acceptable fuels. In fact, the exhaust of Magnegases shows an absence of carcinogenic or other toxic substances, breathable oxygen up to 14%, and carbon dioxide down to 0.01%. The new fuels possess a new chemical structure characterized by clusters of ordinary mols. and atoms under a new bond of electromagnetic nature. These clusters constitute a new chemical species different than the conventional mols., since they are stable at ordinary conditions while exhibiting no IR signature (other than those of conventional mol. constituents), thus confirming that the bond is not of valence type. In particular, the bonding due to the magnetic polarization of the orbitals, from space to toroidal distributions, have resulted to be dominant over elec. effects. For this reason the new chemical species is called "Santilli's electromagnecules" or "**magnecules**". The paper studies the novel **magnecular** structure of Magnegases and confirms that, when the original waste is of fossil or organic type, **magnecules** are essentially constituted by conventional mols. H2, CO, CO2, H2O, plus individual atoms of H, O, and C, as well as radicals such as HO, CH and C-O in single valence bond, all these constituents being bonded together by strong magnetic fields originating from the toroidal polarization of the orbits of valence and other electrons. An estimate is presented, apparently for the first time, of the binding energy of **magnecules** . The combustion of Magnegases produced from liquid feed-stock of fossil origin is fundamentally different than the combustion of any other fuel.

Conventional fuels are constituted by conventional mols., and generally burn according to only one dominant thermochem. reaction. In this sense, the combustion of conventional fuels can be conceived as the ring of a single-stage rocket. Magnegases are instead constituted by conventional mols. bonded into the new magneclusters, thus having a multistage structure, and they generally have a sequence of dominant thermochem. reactions. In this sense, the combustion of Magnegases can be compared to the ring of a multistage rocket, with different fuels in different stages. This paper studies, apparently for the first time, the primary chemical reactions in the combustion of Magnegases of fossil origin. Thus, fuels synthesized under intense elec. and magnetic fields can indeed release energy in amts. much bigger than those predicted by conventional chemical reactions. Since, in addition, the new fuels can be produced anywhere and have environmentally acceptable exhausts, Magnegases offer serious possibilities to satisfy ever increasing energy needs, as well as to contain the alarming environmental problems caused by fossil fuels.

ST Magnegas structure combustion; **magnecule** fuel gas Magnegas

IT Fuel gases
(Magnegases; structure and combustion of Magnegases of fossil origin)

IT Plasma
(arc; structure and combustion of Magnegases of fossil origin)

IT Fuels
(fossil; structure and combustion of Magnegases of fossil origin)

IT Clusters
(magneclusters; structure and combustion of Magnegases of fossil origin)

IT Molecules
(**magnecules**; structure and combustion of Magnegases of fossil origin)

IT Combustion
Magnetic field effects
Molecular structure
Wastes
(structure and combustion of Magnegases of fossil origin)

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; Foundations of hadronic chemistry. With application to new clean energies and fuels 2001
(2) Anon; http://www.i-b-r.org
(3) Anon; http://www.magnegas.com
(4) Aringazin, A; Hadronic J 2000, V23, P1 HCAPLUS
(5) Aringazin, A; Hadronic J 2000, V23, P57 HCAPLUS
(6) Aringazin, A; http://www.arXive.org: physics/0001056 HCAPLUS
(7) Aringazin, A; http://www.arXive.org: physics/0001057 HCAPLUS
(8) Cottrell, T; The strengths of chemical bonds 1958
(9) Kucherenko, M; Hadronic J 1998, V21, P895 HCAPLUS
(10) Pauling, L; The nature of the chemical bonds 1960
(11) Rossini, F; American Petroleum Institute Research Project 44 1953
(12) Rossini, F; Circular of the National Bureau of Standards 500 1952
(13) Santilli, R; Hadronic J 1998, V21, P789 HCAPLUS
(14) Santilli, R; Intern J Hydr Energy 1999, V24, P943 HCAPLUS
(15) Santilli, R; Intern J Hydrogen Energy 2000, V25, P173 HCAPLUS
(16) Santilli, R; J New Energy 1999, V4(1)

L44 ANSWER 13 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:817172 HCAPLUS
DN 135:335394
ED Entered STN: 09 Nov 2001
TI New chemical species of a **magnecule**

IN Santilli, Ruggero Maria
PA Hadronic Press, Inc., USA
SO U.S. Pat. Appl. Publ., 60 pp., Cont.-in-part of U.S. Ser. No. 586,926.
CODEN: USXXCO
DT Patent
LA English
IC ICM C09K003-00
NCL 252062510R
CC 65-5 (General Physical Chemistry)
Section cross-reference(s): 51, 73, 77
FAN.CNT 6

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2001038087	A1	20011108	US 2001-826183	20010404
	US 6540966	B1	20030401	US 2000-586926	20000605
	WO 2003002250	A1	20030109	WO 2002-US3860	20020206
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	WO 2002081601	A1	20021017	WO 2002-US10904	20020404
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	EP 1387876	A1	20040211	EP 2002-763976	20020404
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	US 2004149591	A1	20040805	US 2004-760336	20040120
PRAI	US 1994-254377	B1	19940606		
	US 1997-785797	B2	19970121		
	US 1998-106170	A2	19980629		
	US 1998-133348	B2	19980813		
	US 1999-372278	A2	19990811		
	US 2000-586926	A2	20000605		
	US 2001-826183	A	20010404		
	US 2001-896422	A	20010629		
	WO 2002-US10904	W	20020404		
	US 2002-65111	A2	20020918		
	US 2002-277841	A2	20021022		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 20010038087	ICM	C09K003-00
	NCL	252062510R
US 2001038087	ECLA	B01J019/08D2; C02F001/46J; C10G015/08; C10L003/00; H05H001/24
US 6540966	ECLA	B01J019/08D2; C10G015/08; C10L003/00; H05H001/24
US 2004149591	ECLA	B01J004/00; B01J007/00; B01J019/08D2; C01B003/00;

C01B013/00; C09D007/12D4; C10L003/00; C10L005/00; C25B104/; C25B009/06; C25B015/00; G21K001/00; H01F001/00

AB A novel chemical species, called **magnecules**, which is composed of clusters of mols., and/or dimers, and/or atoms formed by internal bonds due to the magnetic polarization of the orbits of at least some of the peripheral atomic electrons present in the cluster, the intrinsic magnetic field of nuclei present in the cluster, and the intrinsic magnetic fields of valence electrons present in the cluster that are not correlated in singlet couplings to other electrons to form valence bonds is disclosed.

ST **magnecule** atom mol cluster magnetic polarization

IT Electric furnaces
(arc, plasma; new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms formed by passing through)

IT Reaction enthalpy
(excess; new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms with)

IT Magnetic field
(internal; new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms with internal bonds due to intrinsic magnetic field of nuclei)

IT IR spectra
UV and visible spectra
(lack of signatures for new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms)

IT Diesel fuel
Fuel oil
Fuels
(new chemical species of **magnecule** composed of clusters of combustible fuel)

IT Gasoline
RL: PRP (Properties)
(new chemical species of **magnecule** composed of clusters of combustible fuel)

IT Valence electron density
(new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms with internal bonds due to intrinsic magnetic fields of valence electrons)

IT Atoms
Clusters
Magnetic field effects
Magnetization
Molecules
(new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms with internal bonds due to magnetic polarization)

IT Dimers
RL: PRP (Properties)
(new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms with internal bonds due to magnetic polarization)

IT Electromagnetic field
(new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms with internal bonds due to magnetic polarization by)

IT Electric arc
Friction
Microwave
Pressure

(new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms with internal bonds due to magnetic polarization caused by)

IT Mass spectra
(of new chemical species of **magnecule** composed of clusters of mols., dimers, and/or atoms)

IT 124-38-9, Carbon dioxide, properties 630-08-0, Carbon monoxide, properties 1333-74-0, Hydrogen, properties 3315-37-5, Methylidyne 7732-18-5, Water, properties 7782-44-7, Oxygen, properties 12385-13-6, properties
RL: PRP (Properties)
(new chemical species of **magnecule** composed of clusters of)

L44 ANSWER 14 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:738859 HCAPLUS
DN 135:275176
ED Entered STN: 10 Oct 2001
TI Non-fossil fuel additives for predominantly hydrocarbon fuels
IN Richardson, William H., Jr.; Wilcox, James A.; Palmer, Douglas A.
PA McClure, Charles A., USA; Arcall, L.L.C.
SO U.S., 12 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM C10L010-00
NCL 044603000
CC 51-7 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 6299656	B1	20011009	US 1998-221803	19981229
PRAI US 1998-221803		19981229		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6299656	ICM	C10L010-00
	NCL	044603000

AB Non-fossil gaseous fuel, evolved in underwater carbon arcing, and characterized by significant heat content and substantial freedom of its combustion effluents from noxious gases and/or particulates, is similarly useful in whole or part as an additive to predominantly hydrocarbon fuels-whether in bulk storage or transport, flowing in a pipeline, fueling a cutting/welding torch, or fueling an internal-combustion engine. Dosing a predominantly hydrocarbon fuel with all or a selected part of such gaseous fuel mixture inhibits leakage and substantially diminishes noxious effluent gases and particulates as characteristic of the combustion of predominantly hydrocarbon fuels.

ST hydrocarbon fuel additive underwater carbon arcing formation

IT Fuels
(aviation fuel; non-fossil fuel additives for predominantly hydrocarbon fuels)

IT Alkanes, uses
Alkenes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(lower; non-fossil fuel additives for predominantly hydrocarbon fuels)

IT Molecules
(**magnecules**; non-fossil fuel additives for predominantly hydrocarbon fuels)

IT Rubber, uses

RL: DEV (Device component use); USES (Uses)
(membrane; helium ballon-type; non-fossil fuel additives for predominantly hydrocarbon fuels)
IT Coal gas
Diesel fuel
Fuel oil
Fuels
(non-fossil fuel additives for predominantly hydrocarbon fuels)
IT Anthracite
Bituminous coal
Gasoline
Lignite
Natural gas, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(non-fossil fuel additives for predominantly hydrocarbon fuels)
IT Electric arc
(underwater carbon; non-fossil fuel additives for predominantly hydrocarbon fuels)
IT 630-08-0, Carbon monoxide, reactions 1333-74-0, Hydrogen, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(non-fossil fuel additives for predominantly hydrocarbon fuels)
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Booth; US 3409420 1968 HCAPLUS
(2) Maccaferri; US 3781171 1973
(3) Michelfelder; US 4440100 1984
(4) Richardson; US 5435274 1995
(5) Richardson; US 5692459 1997 HCAPLUS
(6) Richardson; US 5792325 1998 HCAPLUS
(7) Richardson; US 5826548 1998

L44 ANSWER 15 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2001:853526 HCAPLUS
DN 136:74797
ED Entered STN: 26 Nov 2001
TI Toroidal configuration of the orbit of the electron of the hydrogen atom under strong external magnetic fields
AU Aringazin, A. K.
CS Department of Theoretical Physics, Karaganda State University, Karaganda, 470074, Kazakhstan
SO Hadronic Journal (2001), 24(4), 395-433
CODEN: HAJODX; ISSN: 0162-5519
PB Hadronic Press
DT Journal; General Review
LA English
CC 65-0 (General Physical Chemistry)
Section cross-reference(s): 77
AB A review. In this paper we overview some results on the hydrogen atom in external static uniform magnetic fields. We focus on the case of very strong magnetic field, B » B0 = 2.3 · 109 Gauss, use various approx. models and, particularly, in the adiabatic approximation have calculated
exactly the integral defining the effective potential. This potential appears to be finite at z = 0. Our consideration of the problem of highly magnetized atoms and mols. is motivated by the recently developed MagneGas technol. by Santilli (http://www.magnegas.com). The ground state electron charge distribution of the hydrogen atom in an intense magnetic field is of a toroidal form, in agreement with that studied by Santilli. This phys. picture is at the foundation of the new chemical species of

magnecules proposed by Santilli.
ST review hydrogen atom strong magnetic field toroidal orbit
IT Potential energy
(effective; for atomic hydrogen in strong magnetic field)
IT Magnetic field effects
Wave function
(toroidal configuration of orbit of electron of hydrogen atom under strong external magnetic fields)
IT 12385-13-6, Hydrogen atom, properties
RL: PRP (Properties)
(toroidal configuration of orbit of electron of hydrogen atom under strong external magnetic fields)
RE.CNT 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Al-Hujaj, O; chem-ph/0003043
(2) Battye, R; Phys Rev Lett 1998, V81, P4798 HCAPLUS
(3) Battye, R; Proc R Soc Lond 1999, VA455, P4305
(4) Becken, W; chem-ph/9902059
(5) Bezchastnov, V; chem-ph/0006016
(6) Detmer, T; chem-ph/9711003
(7) Detmer, T; chem-ph/9711020
(8) Faddeev, L; physics/0003083 2000 HCAPLUS
(9) Heyl, J; chem-ph/9806040 1998
(10) Hietarinta, J; Phys Lett 1999, VB451, P60
(11) Hietarinta, J; University of Turku preprint 1999
(12) Hietarinta, J; http://users.utu.fi/hietarin/knots/index.html
(13) Ivanov, M; chem-ph/0006017
(14) Ivanov, M; chem-ph/9801014
(15) Ivanov, M; chem-ph/9909031
(16) Ivanov, M; chem-ph/9910017
(17) Johnsen, K; chem-ph/9603005 1996
(18) Jones, M; chem-ph/9811041 1998
(19) Kadomtsev, B; JETP 1971, V13, P42
(20) Kadomtsev, B; JETP Lett 1971, V13, P9
(21) Kadomtsev, B; Soviet Phys JETP 1970, V31, P945
(22) Kravchenko, Y; Phys Rev Lett 1996, V77, P619 HCAPLUS
(23) Lai, D; chem-ph/0009333 2000
(24) Landau, L; Quantum Mechanics: Non-Relativistic Theory, 3rd ed 1989
(25) Leitner, D; chem-ph/9808020
(26) Lopez, J; Preprint ICN-UNAM 97-06, chem-ph/9707050
(27) Lopez, J; Preprint ICN-UNAM 99-03, chem-ph/9911535
(28) Melezhik, V; chem-ph/0006019
(29) Melezhik, V; chem-ph/9909030
(30) Potekhin, A; chem-ph/9710046
(31) Ruder, H; Atoms in Strong Magnetic Fields 1994
(32) Santilli, R; Hadronic Chemistry, With Applications to New Clean Energies and Fuels, to appear 2001
(33) Santilli, R; Hadronic J 1998, V21, P789 HCAPLUS
(34) Santilli, R; Intern J Hadrogen Energy 2000, V25, P173 HCAPLUS
(35) Santilli, R; Intern J Hydrogen Energy 1999, V24, P943 HCAPLUS
(36) Santilli, R; Journal of New Energy, Special Edition 1999, V4(1)
(37) Santilli, R; http://www.magnegas.com
(38) Schmelcher, P; chem-ph/0006018
(39) Schmelcher, P; chem-ph/9902060
(40) Schmelcher, P; chem-ph/9909045
(41) Sokolov, A; Quantum mechanics (in Russian) 1979
(42) Turbiner, A; Preprint ICN-UNAM 98-05, chem-ph/9809298
(43) Watanabe, N; Journal of Physical Society of Japan, chem-ph/0011069 2000, V69(9), P2962 HCAPLUS

L44 ANSWER 16 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2000:636897 HCAPLUS
DN 133:298683
ED Entered STN: 14 Sep 2000
TI Alarming oxygen depletion caused by hydrogen combustion and fuel cells and their resolution by magnegas
AU Santilli, Ruggero Maria
CS R&D Director, USMagnegas, Inc., Largo, FL, 33773, USA
SO Los Alamos National Laboratory, Preprint Archive, Physics (2000) 1-15, arXiv:physics/0009014, 4 Sep 2000
CODEN: LNPHF9
URL: http://xxx.lanl.gov/pdf/physics/0009014
PB Los Alamos National Laboratory
DT Preprint
LA English
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 51, 59
AB We recall that hydrogen combustion does resolve the environmental problems of fossil fuels due to excessive emission of carcinogenic substances and carbon dioxide. However, hydrogen combustion implies the permanent removal from our atmospheric of directly usable oxygen, a serious environmental problem called oxygen depletion, since the combustion turns oxygen into water whose separation to restore the original oxygen is prohibitive due to cost. We then show that a conceivable global use of hydrogen in complete replacement of fossil fuels would imply the permanent removal from our atmospheric of 2.8875 + 107 metric tons O2/day. Fuel cells are briefly discussed to point out similarly serious environmental problems, again, for large uses. We propose the possibility of resolving these problems by upgrading hydrogen to the new combustible fuel called magnegas, whose chemical structure is composed by the new chemical species of **magnecules**, whose energy content and other features are beyond the descriptive capacities of quantum chemical In fact, magnegas contains up to 50% hydrogen, while having combustion exhaust with: (1) a pos. oxygen balance (releasing more oxygen in the exhaust than that used in the combustion); (2) no appreciable carcinogenic or toxic substances; (3) considerably reduced carbon dioxide as compared to fossil fuels; (4) considerably reduced nitrogen oxides; and (5) general reduction of pollutants in the exhaust up to 96% of current EPA stds. We also discuss the possibility of further reducing carbondioxide via suitable disposable sponges in the exhaust system, as well as the further reduction of nitrogen oxides with more efficient engine cooling and other means. The anal. therefore indicates that magnegas combustion exhaust already is dramatically below EPA stds., while the achievement of a completely clean exhaust is within technol. reach. Therefore, magnegas appears to be an excellent upgrading of hydrogen, both, for direct combustion and for use in fuel cells. We finally indicate that one of the best applications of the new technol. is that of processing crude oil in the magnegas reactors, by yielding a fuel dramatically cleaner than gasoline, at a cost smaller than that via refineries. In conclusion, crude oil, hydrogenand fuel cells remain indeed fully admissible in this new era of environmental concern, provided that they are treated via a basically new technol. whose quant. study requires a new chemical, called hadronic chemical
ST oxygen depletion hydrogen combustion fuel cell; fuel magnegas hydrogen upgrading oxygen preservation; carbon monoxide hydrogen magnegas
IT Atmosphere (earth)
(alarming oxygen depletion caused by hydrogen combustion and fuel cells and their resolution by magnegas)
IT Fuel gases

(magnegas hydrogen-carbon monoxide mixture; alarming oxygen depletion caused by hydrogen combustion and fuel cells and their resolution by magnegas)
IT 7782-44-7, Oxygen, occurrence
RL: OCU (Occurrence, unclassified); OCCU (Occurrence)
(alarming oxygen depletion caused by hydrogen combustion and fuel cells and their resolution by magnegas)
IT 1333-74-0, Hydrogen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(magnegas containing carbon monoxide and; alarming oxygen depletion caused by hydrogen combustion and fuel cells and their resolution by magnegas)
IT 630-08-0, Carbon monoxide, uses
RL: NUU (Other use, unclassified); USES (Uses)
(magnegas containing hydrogen and; alarming oxygen depletion caused by hydrogen combustion and fuel cells and their resolution by magnegas)
RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; http://www.magnegas.com
(2) Aringazin, A; Journal 2000, V23, P57 HCAPLUS
(3) Aringazin, A; e-print, physics/0001057
(4) Kucherenko, M; Hadronic Journal 1998, V21, P895 HCAPLUS
(5) Kucherenko, M; Hadronic Journal 2000, V23, P1
(6) Kucherenko, M; e-print, physics/0001056
(7) Santilli, R; Ab Initio Hadronic Chemistry 2000
(8) Santilli, R; Hadronic Journal 1998, V21, P789 HCAPLUS
(9) Santilli, R; International Journal of Hydrogen Energy 1999, V24, P943 HCAPLUS
(10) Santilli, R; International Journal of Hydrogen Energy 2000, V25, P173 HCAPLUS

L44 ANSWER 17 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 2000:623661 HCAPLUS
DN 133:225530
ED Entered STN: 07 Sep 2000
TI Non-fossil fuel without harmful combustion effluents
IN Richardson, William H., Jr.
PA USA
SO U.S., 8 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM C07C007-144
NCL 204170000
CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6113748	A	20000905	US 1998-132369	19980811
PRAI	US 1998-132369		19980811		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6113748	ICM	C07C007-144
	NCL	204170000
US 6113748	ECLA	C10L003/00

AB Non-fossil fuel without harmful combustion effluents, the only effluents being water and carbon dioxide. The compns. of which the fuel is made are carbon and water only, which are converted in an underwater elec. arc into hydrogen and carbon monoxide as the major and predominant minor gaseous

mol. constituents. The fuel also contains pseudo-mol. aggregates, as yet unidentified, of higher weight which are seemingly electromagnetically bound, instead of chemical bound, tentatively called **magnecules**.
ST non fossil fuel manuf carbon water elec arc
IT Electric arc
(non-fossil fuel preparation from carbon and water without harmful combustion effluents)
IT Membranes, nonbiological
(semipermeable; non-fossil fuel preparation from carbon and water without harmful combustion effluents)
IT 630-08-0P, Carbon monoxide, preparation 1333-74-0P, Hydrogen, preparation
RL: IMF (Industrial manufacture); PREP (Preparation)
(non-fossil fuel preparation from carbon and water without harmful combustion effluents)
IT 7440-44-0, Carbon, reactions 7732-18-5, Water, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(non-fossil fuel preparation from carbon and water without harmful combustion effluents)
RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Klein; US 3651618 1972 HCAPLUS
(2) Robb; US 3335545 1967
(3) Stoner; US 5632803 1997 HCAPLUS

L44 ANSWER 18 OF 28 COMPENDEX COPYRIGHT 2005 EEI on STN
AN 1999(35):399 COMPENDEX
TI Structures and properties of Fe-C fine particles prepared by AC **arc** discharge.
AU Li, Jian (Southwest China Normal Univ, Chongqing, China); Liu, Cunye; Zhao, Baogang; Lin, Yaoqiang; Deng, Zhaojing
SO Journal of Magnetism and Magnetic Materials v 195 n 2 1999.p 470-475
CODEN: JMMMDC ISSN: 0304-8853
PY 1999
DT Journal
TC Theoretical; Experimental
LA English
AB Fe-C fine particles are produced by an alternating **arc** discharge between iron and **carbon electrodes** in an Ar **gas** atmosphere at pressures of 8, 14 and 18 kPa. The crystal structure, morphology and surface composition have been studied, respectively, by X-ray diffraction, transmission electron microscopy, selected area electron diffraction and X-ray photoelectron **spectroscopy**. Magnetic properties and Curie temperatures have also been determined by a vibrating sample magnetometer. Results show that the particles are of two different crystal structures, one is hexagonal FeC and the other is cubic iron. The iron particles have a multi-layered composed of an alpha -Fe core wrapped by Fe3O4, FeO and FeO(OH) shells. It is found that the compositions and the specific saturation magnetization of the Fe-C particles prepared in different pressures of Ar **gas** are not the same, but their Curie temperatures are all 580 plus or minus 5 degree C.(Author abstract) 20 Refs.
CC 531.1 Metallurgy; 545.1 Iron; 549.3 Others (including Bismuth, Boron, Cadmium, Cobalt, Mercury, Niobium, Selenium, Silicon, Tellurium and Zirconium); 701.1 Electricity: Basic Concepts and Phenomena; 933.1.1 Crystal Lattice; 931.2 Physical Properties of Gases, Liquids and Solids
CT *Binary alloys; Temperature; Particles (particulate matter); Electric **arcs**; Crystal structure; Morphology; Structure (composition); Magnetic properties; Iron; Cobalt

ST Ultrafine particles; **Arc** discharge; Surface composition; Curie temperature; Argon **gas**
ET C*Fe; Fe-C; Ar; FeC; Fe cp; cp; C cp; Fe; Fe*O; Fe3O4; O cp; FeO; Fe*H*O; FeO(OH); H cp; C

L44 ANSWER 19 OF 28 COMPENDEX COPYRIGHT 2005 EEI on STN
AN 1999(44):1796 COMPENDEX
TI Physics of new clean energies and fuels according to hadronic mechanics, Paper V: Structure of molecules, new, clean, fuels, and new energies of Class III.
AU Santilli, Ruggero Maria
SO Journal of New Energy v 4 n 1 1999.p 205-313
CODEN: JNENFI ISSN: 1086-8259
PY 1999
DT Journal
TC Theoretical
LA English
AB The last series of five articles outlining the systematic research on new energies and fuels at the particle, nuclear, and molecular levels is presented.This series contains: an outline of the rather serious environmental problems created by fossil fuels due to large carcinogenic substances in the exhaust, alarming oxygen depletion in the atmosphere, greenhouse effect, and other problems; the rather serious insufficiencies of molecular structures as predicted by quantum chemistry; a new model for molecules permitted by hadronic mechanics, which revolves said inconsistencies; and evidence for a new chemical species called **Magnecules**, which are composed of ordinary atoms and molecules under a new strong magnetic bond.26 Refs.
CC 525.3 Energy Utilization; 621.1.2 Nuclear Fuels for Fission Reactors; 454.2 Environmental Impact and Protection; 522 Gas Fuels; 443.1 Atmospheric Properties; 451 Air Pollution
CT *Energy utilization; Nuclear fuels; Environmental impact; Fossil fuels; Greenhouse effect; Molecular structure; Quantum theory; Mathematical models
ST Clean energy; Hadronic mechanics
ET V

L44 ANSWER 20 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1999:301815 HCAPLUS
DN 131:52950
ED Entered STN: 18 May 1999
TI Magnetic moment of the polarized isoelectronium orbit in the hydrogen molecule
AU Kucherenko, M. G.; Aringazin, A. K.
CS Orenburg State University, Orenburg, 460352, Russia
SO Hadronic Journal (1998), 21(6), 895-901
CODEN: HAJODX; ISSN: 0162-5519
PB Hadronic Press
DT Journal
LA English
CC 77-1 (Magnetic Phenomena)
Section cross-reference(s): 65
AB As a result of efforts by various scholars (including one of the authors, A.K.A.) initiated back in 1978, a new mechanics known as hadronic mechanics has recently reached axiomatic and operational maturity. By using these results, R. M. Santilli and D. D. Shillady have recently presented a covering of quantum chemical under the name of hadronic chemical whose main hypothesis is that a pair of valence electrons bond themselves into a singlet quasiparticle state called isoelectronium with charge -2e,

spin 0, magnetic moment 0 and radius 6.8 + 10-11 cm, which moves around the two nuclei with an oo-shaped orbit. Subsequently, Santilli has submitted the theor. prediction as well as a number of independent exptl. verifications of the existence of a new chemical species proposed under the name of **magnecules** whose bonds are due to the magnetic moments of polarized orbits of the isoelectronium. In particular, Santilli has presented preliminary calcns. according to which the latter magnetic moment for the case of the H mol. is 1,316 bigger than the magnetic moment of the nucleus (the proton). Without any consideration on the merit of hadronic chemical, the authors present independent calcns. which confirm the above numerical estimate, yielding a value of the ratio of the magnetic moment of the polarized isoelectronium orbit in the ground state of the H atom and the proton magnetic moment of the order of 1.314-1.315, thus confirming the possibility of Santilli's **magnecules**.

ST **magnecule** hydrogen; magnetic moment polarized isoelectronium orbit hydrogen

IT Quantum chemistry
(hadronic; magnetic moment of polarized isoelectronium orbit in hydrogen mol.)

IT Quasiparticles and Excitations
(magnetic moment of polarized isoelectronium orbit in hydrogen mol.)

IT Magnetic moment
(orbital; magnetic moment of polarized isoelectronium orbit in hydrogen mol.)

IT 1333-74-0, Hydrogen, properties
RL: PRP (Properties)
(magnetic moment of polarized isoelectronium orbit in hydrogen mol.)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Santilli, R; Ab Inition Hadronic Chemistry 1998
(2) Santilli, R; Elements of Hadronic Mechanics, second edition 1995, VI, II
(3) Santilli, R; Found Phys 1997, V27, P635
(4) Santilli, R; Hadronic J 1998, V21, P789 HCAPLUS
(5) Santilli, R; to be published in Intern J Hydrogen Energy
(6) Web Site of Toups technology Licencing; http://www.toupstech.com/aquafuel/aquaII-pIII.html

L44 ANSWER 21 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1999:301814 HCAPLUS
DN 131:63700
ED Entered STN: 18 May 1999
TI Theoretical prediction and experimental verifications of the new chemical species of **magnecules**
AU Santilli, Ruggero Maria
CS Institute for Basic Research, Palm Harbor, FL, 34682, USA
SO Hadronic Journal (1998), 21(6), 789-894
CODEN: HAJODX; ISSN: 0162-5519
PB Hadronic Press
DT Journal
LA English
CC 65-5 (General Physical Chemistry)
Section cross-reference(s): 73, 76, 77
AB As a result of comprehensive studies by various scholars initiated back in 1978, a generalization-covering of quantum mechanics under the name of hadronic mechanics has been built and has now reached operational maturity. Thanks to these results, D. D. Shillady and I have introduced in three preceding papers a generalization-covering of quantum chemical under the name of hadronic chemical and proved its effectiveness in achieving representations of mol. data accurate to several digits. In this paper I

present, apparently for the first time, the most compelling exptl. evidence to date supporting hadronic mechanics and chemical, the theor. prediction and several independent exptl. verifications of a new chemical species, i.e., atoms and mols. bonded by a new force. The origin of the new species rest in the magnetic moment of electrons in their orbits around nuclei, which has been ignored throughout this century due to their spherical distribution. In this paper I show that the polarization in a plane of the orbit of the electron of the hydrogen atom implies the emergence of a magnetic moment which is 1,316 bigger than the magnetic moment of the nucleus (the proton). Such a large value is then sufficient to permit the theor. prediction of corresponding strong magnetic bonds between atoms and mols. which are stable at ordinary conditions. Various consistency aspects imply the necessary use of hadronic mechanics and chemical, e.g., to prevent that all mols. are ferromagnetic. In view of the magnetic origin of the new bond, I submit the names of **magnecules** for the new species, in order to distinguish it from the conventional "mols." denoting valence bonds. I then present various exptl. confirmations by independent labs. on the existence and anomalous properties of **magnecules** in gases, liqs. and solids. The memoir ends with an indication without detailed treatment that the new species implies the birth of new technologies currently under development by Toups Technol. Licensing Corporation, of Largo Florida, Givaudan-Roure Corporation of Teaneck, New Jersey, and other U.S. Corporations.

ST new chem species **magnecule** hadronic chem mechanics; magnetic moment electron new force atom mol hadronic chem; bond magnetic atom mol new force hadronic chem

IT Adhesion, physical
Chemistry
Electric discharge
Energy
Gas chromatography
IR spectroscopy
Magnetic field effects
Magnetic moment
Magnetization
Mass spectrometry
Microstructure
Viscosity
(hadronic-chemical theor. prediction and exptl. verifications of existence of new chemical species of **magnecules** in gaseous, liquid and solid systems)

IT Essential oils
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(hadronic-chemical theor. prediction and exptl. verifications of new chemical species of **magnecules** in fragrance oils in magnetic field)

IT Quasiparticles and Excitations
(isoelectronium; hadronic-chemical theor. prediction and exptl. verifications of existence of new chemical species of **magnecules** in gaseous, liquid and solid systems)

IT Clusters
(magneclusters; hadronic-chemical theor. prediction and exptl. verifications of existence of new chemical species of **magnecules** in gaseous, liquid and solid systems)

IT Molecules
(**magnecules**; hadronic-chemical theor. prediction and exptl. verifications of existence of new chemical species of **magnecules** in gaseous, liquid and solid systems)

IT Bond
(magnetic; hadronic-chemical theor. prediction and exptl. verifications of existence of new chemical species of **magnecules** in gaseous, liquid and solid systems)
IT Force
(new; hadronic-chemical theor. prediction and exptl. verifications of existence of new chemical species of **magnecules** in gaseous, liquid and solid systems)
IT 124-38-9, Carbon dioxide, processes 630-08-0, Carbon monoxide, processes 1333-74-0, Hydrogen, processes 7782-44-7, Oxygen, processes
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(hadronic-chemical theor. prediction and exptl. verifications of new chemical species of **magnecules** in AquaFuel gaseous mixture)
RE.CNT 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; Physics and Chemistry of Small Clusters 1982
(2) Anon; htt://www.eagle-research.com
(3) Anon; httop://www.mpmtech.com
(4) Boyer, D; Bonding Theory 1968
(5) Dammann, W; US 5159900 1992
(6) Dammann, W; US 5417817 1995
(7) Eisenberg, D; The Structure and Properties of Water 1969
(8) Eldridge, H; US 603058
(9) Hanna, M; Quantum Mechanical Chemistry 1965
(10) Memory, J; Quantum Theory of Magnetic Resonances Parameters 1968
(11) Richardson, W; US 5435274 1995
(12) Richardson, W; US 5692459 1997 HCAPLUS
(13) Richardson, W; US 5792325 1999 HCAPLUS
(14) Santilli, R; Ab Initio Hadronic Chemistry 1999
(15) Santilli, R; Elements of Hadronic Mechanics, 2-nd ed 1995, VI and II
(16) Santilli, R; Found Phys 1998, V27, P625
(17) Santilli, R; Foundations of Theoretical Mechanics 1978, VI
(18) Santilli, R; Foundations of Theoretical Mechanics 1983, VII
(19) Santilli, R; Hadronic J 1978, V1, P228
(20) Santilli, R; Hadronic J 1998, V21, P633 HCAPLUS
(21) Santilli, R; Hadronic J 1998, V21, P715 HCAPLUS
(22) Santilli, R; Hadronic J 1998, V21, P759 HCAPLUS
(23) Santilli, R; Infinite Energy 1998, V22(issue 4), P3
(24) Santilli, R; Theoretical Prediction and Experimental Verifications of the New Species of Magnecules 1999
(25) Santilli, R; to be published in Intern J Hydrogen Energy 1999
(26) Web site of Toups Technology Licensing; http://www.toupstech.com
(27) Web site of Toups Technology Licensing; http://www.toupstech.com/aquafuel/
(28) Web site of Toups Technology Licensing; http://www.toupstech.com/aquafuel/aquaII-pIII.html

L44 ANSWER 22 OF 28 COMPENDEX COPYRIGHT 2005 EEI on STN
AN 1998(33):4591 COMPENDEX
TI Density of particles on center axis of **arc** frame for generation of carbon nanotubes.
AU Shimada, Yoshihito (Univ of Osaka Prefecture, Sakai, Jpn); Akita, Seiji; Suzuki, Satoru; Nakayama, Yoshikazu
SO Electronics & Communications in Japan, Part II: Electronics (English translation of Denshi Tsushin Gakkai Ronbunshi) v 81 n 1 Jan 1998.p 41-46
CODEN: ECJEEJ ISSN: 8756-663X
PY 1998
DT Journal

TC Experimental
LA English
AB This study analyzes the growth process of nanotubes.Using helium as the inert **gas**, an **arc** discharge plasma is generated between **carbon electrodes**, and the spatial distribution of the emission and its dependency on the **gas** pressure are examined.Based on the emission intensities of C plus at wavelengths of 657.8 and 723.6 nm, the plasma temperature is determined by two-**spectral** line intensity comparison.It is seen that the plasma temperature rises from the anode to the cathode and falls with increase of the **gas** pressure.The temperature near the cathode, where the nanotubes grow, is between 5500 and 6000 K.Based on the particle density-temperature relation derived by a theoretical calculation, the neighborhood of the cathode, where the nanotubes grow, seems mostly occupied by the monomer C.The particle density, which is derived from the emission intensity and the temperature distribution, decreases from the anode to the cathode, indicating that C is transported by diffusion from the anode toward the cathode.The diffusion rate of C near the cathode increases with increase of the **gas** pressure, which enhances the transport of C toward the cathode.The particle density of C plus derived by the same method decreases from the anode to the cathode, indicating that there exists a diffusion in addition to the drift from the anode to the cathode.The particle density increases with **gas** pressure.This suggests that the density of the carbon monomer and its transport are the important factors for the growth of nanotubes in an **arc** discharge.(Author abstract) 15 Refs.
CC 804 Chemical Products Generally; 933.1 Crystalline Solids; 932.3 Plasma Physics; 714.1 Electron Tubes; 701.1 Electricity: Basic Concepts and Phenomena; 801 Chemistry
CT *Carbon; Helium; Plasmas; **Gas** emissions; Cathodes; Monomers; Electric discharges; Emission **spectroscopy**; Nanostructured materials
ST Carbon nanotubes; **Arc** discharges; Plasma temperature
ET C

L44 ANSWER 23 OF 28 JICST-EPlus COPYRIGHT 2005 JST on STN
AN 961011925 JICST-EPlus
TI Generation and **Spectroscopic** Observation of large area Induction Plasma for Producing Fullerene.
AU SAKUTA TADAHIRO; NISHIDA YUSUKE; BANJO TOSHIYUKI
TAKIGAWA HIROFUMI; MATSUO HIRONOBU
CS Kanazawa Univ.
Toyohashi Univ. of Technol.
SO Denki Gakkai Kaihei Hogo Kenkyukai Shiryo, (1996) vol. SP-96, no. 62-80, pp. 141-149. Journal Code: Z0966B (Fig. 7, Tbl. 2, Ref. 2)
CY Japan
DT Conference; Article
LA Japanese
STA New
AB In order to produce fullerene particles, vacuum d.c. plasmas have been used with **carbon electrodes** under appropriate **gaseous** conditions such as Ar, He or CO2. The d.c. plasma method, however, seems to have several problems with respects to the higher rate of processing due to relatively small area of plasma, consumming of **carbon electrodes** and impossibility of using ceramics materials as electrodes. An attempt is made here to use radio frequency(r.f.) induction plasma for synthesize the fullerene particles. An r.f. induction plasma system consists of main plasma region defined by a quarz tube with an innerdiameter of 80mm, 3-turn coil and a 1.6MHz

oscillator (maximum power 200kW). Experiments were performed under He and CO2 **gas** circumstance at two different pressure conditions of 2.5 and 10kPa. Such operating condition selected for **gas** and pressure were found to be almost suitable ones for fullerene synthesis in previous experiments carried out by d.c. vacuum **arc** method. The inductively-coupled plasma under He and CO2 **gas** conditions were sucessively generated at an r.f. power level of 30kW. **Spectroscopic** observation of the plasma was made for atomic line emissions (C,C+,O,O+) and molecular band **spectrums** (C2). Discussions were made mainly on the each temperature of atomic excitation and molecular **vibrational** temperature for different pressure conditions, with keeping the other parameters (**gas** flow and power) constant. (author abst.)

CC BJ02060E (533.9.03)

CT plasma; electromagnetic induction; HF; mixed **gas**; helium; carbon dioxide; emission **spectrum**; **spectral** analysis; **vibrational** excitation; carbon; molecule; oxygen; atom; pressure dependence; molecular cluster; fullerene

BT induction; frequency(Hz); frequency; **gas**; mixture; object; rare **gas**; element; carbon oxide; oxide; chalcogenide; oxygen group element compound; oxygen compound; carbon compound; carbon group element compound; **spectrum**; analysis; excitation(physics); second row element; carbon group element; oxygen group element; dependence

L44 ANSWER 24 OF 28 JICST-EPlus COPYRIGHT 2005 JST on STN

AN 950535937 JICST-EPlus

TI Film deposition and Fullerene Formation by Pulsed Laser Ablation using Carbide Targets.

AU ASAKAWA TOSHIAKI; YOSHIMOTO MAMORU; KOINUMA HIDEOMI; KIM M S

CS Tokyo Inst. of Technol.

SO Nippon Kagakkai Koen Yokoshu, (1995) vol. 69th, no. 1, pp. 408. Journal Code: S0493A
ISSN: 0285-7626

CY Japan

LA Japanese

STA New

AB Formation of C60 was confirmed firstly by pulsed laser vaporization of graphite under the flow of high density helium **gas**, and then bulk quantities of C60 could be synthesized by **arc** discharge between **carbon electrodes**, in helium **gas** atmosphere. Here we report our serendipitous discovery of C60 formation from Carbide targets by pulsed excimer laser deposition of thin film. The laser desorption time-of-flight mass **spectrometry** was applied to a WC bulk crystal and their films deposited by pulsed KrF excimer laser ablation. Intense peaks at m/z=720-723 were detected from the thin films laser ablated from WC at a pressure from 1*10-6Torr to 20Torr. The intensity ratios coinside with those of C60. From other metal carbides such as TiC, C60 could also be produced in the same way. Thus, the pulsed excimer laser deposition is found to provide not only a new route to C60 but also a unique segregation or distillation process of solid solutions. (author abst.)

L44 ANSWER 25 OF 28 COMPENDEX COPYRIGHT 2005 EEI on STN

AN 1986(7):100742 COMPENDEX DN 860763488; *8693687

TI **SPECTRAL** EMISSION ANALYSIS OF POWDERS IN A HIGH-VOLTAGE **ARC** WITH THE SAMPLE INTRODUCED FROM A THIN TUBE.

AU Trapitsyn, N.F.; Skuratova, T.A.

SO J Appl Spectrosc v 43 n 2 Aug 1985 p 827-830
CODEN: JASYAP ISSN: 0021-9037

PY 1985
DT Journal
TC Experimental
LA English
AB A powder sample prepared in the form of a thin long rod or thin tube and moved uniformly into a horizontal **arc** burning between two **carbon electrodes** for **spectral** analysis is described.The results indicate that **feeding** powder samples from the thin rod into a high-voltage ac **arc** makes it possible to work without an internal standard, increasing the efficiency of the analytic work.6 refs.
CC 804 Chemical Products; 941 Acoustical & Optical Measuring Instruments; 701 Electricity & Magnetism; 741 Optics & Optical Devices
CT *POWDERS:**Spectrum** Analysis; ELECTRIC **ARCS** :Applications; **SPECTROGRAPHS**:Light Sources
ST HIGH VOLTAGE **ARC**; POWDER SAMPLE; **CARBON ELECTRODES**; **SPECTRAL** EMISSION

L44 ANSWER 26 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1975:549902 HCAPLUS
DN 83:149902
ED Entered STN: 12 May 1984
TI Pyrolytic **carbon** deposition in **electrodes** of **electric arc** heaters for natural **gas**
AU Dobrinskii, E. K.; Sidorov, V. I.; Stolyarov, A. A.; Fridberg, A. E.
CS USSR
SO Khimicheskaya Promyshlennost (Moscow, Russian Federation) (1975), (5), 373-4
CODEN: KPRMAW; ISSN: 0023-110X
DT Journal
LA Russian
CC 51-4 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 47
AB The deposition of pyrolytic C [7440-44-0] on the inner walls of hollow **electrodes** of **elec. arc** heaters, for heating natural **gas** was investigated. At first a friable layer of pyrolytic C is deposited, and after long use, the thickness of the layer increases, the layer becomes hard, and the C can be removed only with difficulty. The effect of wall thickness (i.e., of heat exchange with cooling water), and of **gas** flow rate on deposit formation was studied in discharge electrodes with channels 5 mm in diameter, in 20-kW and 200-kW installations, and the results were correlated with the operation of an industrial 8-MW reactor. The coking may be decreased by (a) lowering the internal surface temperature of the electrodes (e.g., by using thinner walls), (b) creating a **gas** curtain, to hinder the deposition of soot on the walls and simultaneously lower the wall temperature, (c) removing the C layer before it hardens, by means of **vibration** , and (d) using the maximum **gas** flow rates in the electrode.
ST carbon deposit electrode heater
IT Heaters
(**elec.-arc**, for natural **gas**, coking of)
IT **Electrodes**
(of **elec.-arc** heaters for natural **gas**, coking of)
IT 7440-50-8, uses and miscellaneous 12597-69-2, uses and miscellaneous
RL: USES (Uses)
(electrodes of, in **elec. arc** heaters for natural **gas**, coking of)
IT 7440-44-0P, preparation

RL: PREP (Preparation)
(pyrolytic, formation of, prevention of, in **elec. arc** heaters for natural **gas**)

L44 ANSWER 27 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1974:115731 HCAPLUS
DN 80:115731
ED Entered STN: 12 May 1984
TI Effects of the discharge **gas** on physical and **spectrochemical** processes in the carbon **arc**. I. Physical investigations on the characterization of the carbon **arc** in different discharge **gases**
AU Nickel, H.; Mazurkiewicz, M.
CS Inst. Reaktorwerkst., Kernforschungsanlage Juelich G.m.b.H., Juelich, Fed. Rep. Ger.
SO Fresenius' Zeitschrift fuer Analytische Chemie (1974), 268(1), 1-9
CODEN: ZACFAU; ISSN: 0016-1152
DT Journal
LA German
CC 79-6 (Inorganic Analytical Chemistry)
Section cross-reference(s): 71, **73**
AB Evaporation and excitation of Fe and Ag in the C **arc** were studied under Ar, He, and Ar-O. The influence of evaporation on the line intensity as a function of the discharge **gas** was determined by **spectrochem**. anal. The macroscopic particle movement in the **arc** plasma and evaporation and flow were studied by determining directly the material distribution in the electrodes and in the discharge cell after the burning time by 59Fe and 110Ag and by high-speed photographs. In the 3 **gases** a substantial difference in temperature distribution was measured. The **spectrochem**. results depended strongly on the phys. properties of the discharge **gases** which cause differences in the evaporation rate of electrodes, the flow procedure during the burn-up, the **arc** form, the temperature distribution, and the energy dissipation in the **arc** plasma.
ST carbon **arc** discharge **gas**; **spectrochem** analysis carbon **arc**; argon carbon **arc**; helium carbon **arc**; oxygen carbon **arc**; iron **spectrochem** analysis; silver **spectrochem** analysis; electrode evapn carbon **arc**; excitation carbon **arc**
IT **Electrodes**
(**carbon**, in **spectrog. arcs**, effect of discharge **gas** on consumption of)
IT **Spectrochemical** analysis
(emission, effect of discharge **gas** on **elec. arc** processes in)
IT Evaporation
(in **spectrog. arcs**, effect of discharge **gas** on)
IT Energy level excitation
(of atoms by **elec. arcs**, in **spectrog.** anal., effects of discharge **gas** on)
IT **Electric arc**
(**spectrog.**, with **carbon electrodes**, effect of discharge **gases** on processes in)
IT 7782-44-7, uses and miscellaneous
RL: USES (Uses)
(argon atms. containing, in elec. **arc**, **spectrog.** anal. in relation to)

IT 7440-44-0, uses and miscellaneous
RL: USES (Uses)
(electrodes, for **spectrog.**, effect of discharge **gases** on consumption of)
IT 7440-37-1, uses and miscellaneous 7440-59-7, uses and miscellaneous
RL: USES (Uses)
(in elec. **arcs**, **spectrog.** anal. in relation to)

L44 ANSWER 28 OF 28 HCAPLUS COPYRIGHT 2005 ACS on STN
AN 1962:35743 HCAPLUS
DN 56:35743
OREF 56:6747f-i
ED Entered STN: 22 Apr 2001
TI Some physical properties of **carbon electrodes** for **spectral** analysis
AU Plsko, Eduard
CS Slovak Acad. Sci., Bratislava, Czech.
SO Chemicke Zvesti (1961), 15, 404-13
CODEN: CHZVAN; ISSN: 0366-6352
DT Journal
LA Unavailable
CC 9 (Electric and **Magnetic** Phenomena)
AB The d.c. **arc** characteristics of 13 electrodes of different manufacture were compared. The current, voltage, and radiation intensity (determined with a vacuum thermocouple) were measured with mirror galvanometers and recorded photographically as functions of time. The distance d between electrodes, which began as 1 mm. and increased with time, was determined from an enlarged image of the **arc** projected on a mm. scale, and also recorded as a function of time. Curves of elec. and radiation characteristics were then plotted against d. The stability of the **arc** was followed with a **gas**-filled photocell registering on an oscillograph screen, which was photographed on moving film. The elec. resistance and x-ray powder diagrams of each electrode were also obtained. The electrodes ranged from strongly crystalline (graphitic) to nearly amorphous. The elec. resistance decreased and the heat conductivity increased with increasing crystallinity. Nineteen operating characteristics, such as the elec. conditions and electrode distance when the are was extinguished, the time of burning, elec. conditions at d = 7 mm., conditions at the transition from a noisy to a silent **arc**, and the time to reach maximum emitted energy, were calculated and correlated with the elec. resistance and crystallinity for all electrodes. E.g., with increasing elec. resistance, the maximum resistance of the **arc** when extinguished increased, d at the transition to a silent **arc** increased, and the transition was more gradual. The characteristics of an ideal graphite electrode are listed. The results make possible quality control of the manufacture of electrodes.
IT Electrodes
(carbon, for **spectral** analysis)
IT Crystallinity
(of **carbon electrodes** for **spectral** analysis, elec. resistance and thermal conductivity in relation to)
IT Conductivity, thermal and(or) Conduction, thermal
(of **carbon electrodes**, for **spectral** analysis, crystallinity and)
IT Electric resistance
(of carbon-Cu-Sn alloys containing graphite, for **spectral** analysis, crystallinity and)
IT Analysis

(**spectrochem**, C electrodes for)
IT 183748-02-9, Electron
(nitrogen oxide (N2O) dissociation by)

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